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The AUTOMOBILE

Metric or English Measurements?

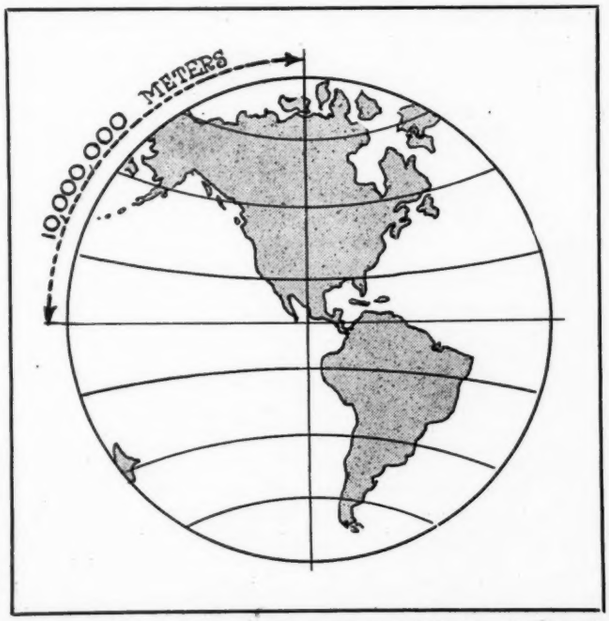
Although American Automobile Engineers and Scientists Are in Favor of the French Units of Weight and Measure, Economic Considerations Render Their Adoption a Problem

Anglo-Saxon System Has Progressed But Little in the Last Millennium, Whereas the Metric Is a More Recent Product and Is Better Adapted to Modern Conditions

Part I

FORTY-SIX years ago the United States government legalized the use of the metric system of weights and measures in this country. Today we are still struggling along with the incongruous English system of pounds, feet, and square and cubic units even though we acknowledge it to be inferior to the other system. We say that 12 inches make a foot, that 3 feet make a yard and go on laboring under this arbitrary arrangement when our French friends take the meter as their standard length unit, and say that the next larger measure is 10 times greater and that the next smaller is 10 times less.

Much discussion and argument, both by statesmen and by engineers and tradesmen, has been carried on for and against the metric system. **That it would be a distinct advantage to us if the metric system were in general use most authorities agree, but the great loss to our industries and manufacturers which the change would incur is the one insurmountable obstacle.**

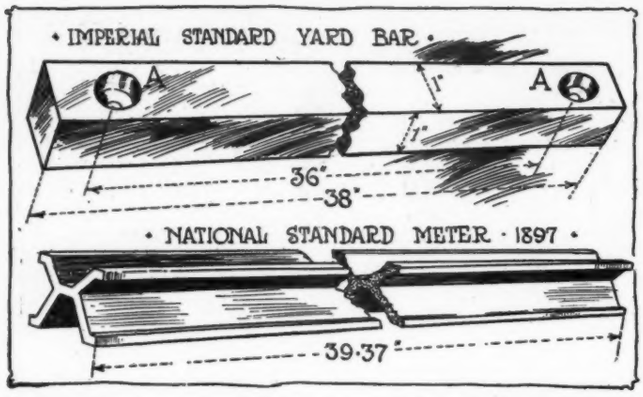


The quarter meridian of the earth was taken as the length from which the standard French unit or meter was determined as one ten-millionth part

Automobile engineers are almost unanimous in agreeing that it would be a great saving and advantage to them once it was in use in place of the English system, but their machinery and equipment is all designed for the latter, and, quite naturally, none of them wishes to make the change, because it is a matter of dollars and cents. Their workmen are all educated to the foot, inch and yard system, and it would take considerable time to get them accustomed to any other method of determining the size of any piece. Draughtsmen are accustomed to figuring in inches and in incongruous fractions of the inch, and they would require some time to be able to think in any other units. These men are all on the commercial side of the question.

The scientist will almost invariably argue in favor of the metric system, because it is logical and because to him its use in place of the English system does not involve any commercial consideration. He can buy his instruments graduated in centimeters, millimeters, grams and the like just as cheaply as he can purchase those apportioned in feet, inches, pounds and so on. Change from one system to another with him does not involve the scrapping of expensive equipment. He says that the metric system is the only logical one to use, and he has every point in his favor, except the one of the immense cost of the change.

And so here we have both sides of the question. On the one hand we see the scientific fraternity all fighting to get our government to adopt as compulsory a system of weights and measures which is based on solid and rational principles, and on the other the great army of manufacturers, merchants and tradesmen in general, who, from commercial considerations, do not wish to change. And they have won every fight against the com-



The standard prototype meter and yard, both of which are carefully preserved. The wells A-A in the yard bar are sunk half an inch, and at the bottom of each well a gold stud is inserted on which the defining line of the yard is engraved

pulsory use of the metric system, because the change would mean millions of dollars to them. Certain it is that, if the system is ever adopted, it must be done very gradually, so that there will be ample time for readjustment of this most important consideration to any people—that of weights and measures.

Few of us in these busy times stop to consider what an important part in our civilization the subject of weights and measures plays. Indeed, it is as old as language itself and evidences of its influence upon trade and conditions are to be traced back to the earliest days of the human race. Primitive man counted his possessions in terms with which he was familiar and according to the standards of his time. It was natural for him to consider distances in terms of his simple objects. He took the length of his foot or the width of his hand or the length of his finger as a basis of length comparison and it was but natural that these dimensions of the body should furnish the basis for his measurements. Perhaps such articles as gourds, egg shells and the like formed the foundation for his measurements of volume, while for weights he used seeds. These were rough standards, arbitrarily selected, and had no logical basis for their foundation. Yet today, in our own enlightened times, we make use of just such arbitrary standards and use them for a basis for some of our ultra-scientific and engineering considerations.

It is interesting to trace the science of metrology back to its early times and to see how little the English standards have developed in the last 1000 years. Most metrologists credit the origin of systems of weights and measures to Babylon and Egypt, which countries evidently derived their systems from a common source. The pyramid of Ghizeh, which dates back to about 4000 B. C., has been considered by authorities to contain various writings and other archæological records bearing upon some of the earliest methods of apportioning land and for fixing various standards of weights and measures.

In Greek and Roman Records

Greece was among the first to have weights and measures systems, of which we have accurate records. Rome naturally observed the same standards and between the two there seems to have been a close connection. It is certain as to where the early Anglo-Saxons derived their systems, but early they attempted to make them standard by various laws of more or less merit. In the Domesday Book, which was published in 1086, the Saxon yard was mentioned as a unit of measurement and soon afterwards, during the reign of Henry I, who ruled from 1100 to 1135, it is stated that the legal yard had a length equal to that of the ruler's arm. Richard I enacted laws providing for standards of length made of iron, and for measures of capacity the brims of which were lined with this metal also. The Magna Charta did much to establish uniformity by stating that there should be one measure of wine, one of ale, one of corn, and so on.

So on down through the reigns of the various English monarchs laws were enacted and standards constructed bringing the different measures down to the present. From time to time the statutes were changed to conform with the then-considered correct method of apportioning lengths, weights and volumes. We find many acts passed to carry out the intent of the fundamental standardization principle as laid down in the Magna Charta of 1215. From the time of the Saxon Kings, the unit of monetary weight was the pound, yet there was no law in actual force until 1266 specifically laying down the relations between weights and measures. This law of the Assize of Bread and Ale stated that "By the consent of the whole realm of England, the measure of our Lord the king was made, viz., an English penny called a sterling, round and without any clipping, shall weigh thirty-two wheatcorns in the midst of the ear; and twenty pence do make an ounce, and twelve ounces a pound, and eight pounds do make a gallon of wine, and eight gallons of wine do make a bushel, which is the eighth part of a quarter." This is the definition of the old Tower pound and it was the earliest form of the present British sterling pound.

With such arbitrary beginnings, it is no wonder the system which we know to-day is the intricate and irrational one that it is. There is no logical basis for the taking of 36 inches as a yard, nor for the progressing from 1 inch to a foot by 12 units.

The metric system, while it had an early beginning, is much younger than the English system and it has a sound foundation on which to rest. History of the metric system, which is founded on the decimal notation, dates back to about 1670, when one Gabriel Mouton of Lyons, France, proposed a comprehensive decimal system having as a basis the length of an arc of 1 minute of a great circle of the earth. Somewhat later, in 1720, a plan was proposed by Cassini, recommending the adoption of a unit equal to 1-6000 part of a minute of an arc of a great circle, which unit had a length of about half that proposed by Mouton. Du Fay, in 1747, brought forward a plan which involved the length of the second's pendulum as a unit. This was subsequently elaborated and continued by La Condamine, who took into consideration the variation in length of the pendulum at different altitudes in determining his standard unit. Several others at that time advocated in France the use of the pendulum unit instead of the proposed fraction of the arc of the meridian, since they believed that the former could be more readily determined.

Present System Adopted 1790

All through the eighteenth century, schemes based on these units were proposed for the improvements of the systems of weights and measures then in vogue. It appears that the French Government appreciated the necessity for some such uniformity throughout the country, but one after the other the schemes were considered and discarded, largely through fear of the immense amount of antagonism and confusion which their adoption would create.

It was not until 1790 that a plan which was the real instrument for causing the ultimate adoption of the present metric system was finally adopted by the National Assembly of France. This scheme had as its backer Talleyrand, the Bishop of Autun, who proposed as a fundamental unit the length of a second's pendulum at 45 degrees latitude, and as a unit of weight that of a cube of water the height of which should be one-twelfth the pendulum's length. After consideration by the Committee on Agriculture and Commerce, the proposal was accepted and sanctioned by Louis XVI in 1790. After settling upon the principle of decimal division the next important step was the selection of a unit. In 1791 three suitable units were under consideration. These were the length of the second's pendulum, the quadrant of a great circle of the equator, and the quadrant of a great circle of the meridian. After great care and deliberation, it was finally decided that the unit should be based upon the quadrant of the meridian, since, while it was not as easy a measurement as the pendulum length, it at the same time had a nearer relation to the accepted means of measurement of length. It was also considered that the length of a quarter meridian could be deter-

mined much easier than could that of a similar section of the equator.

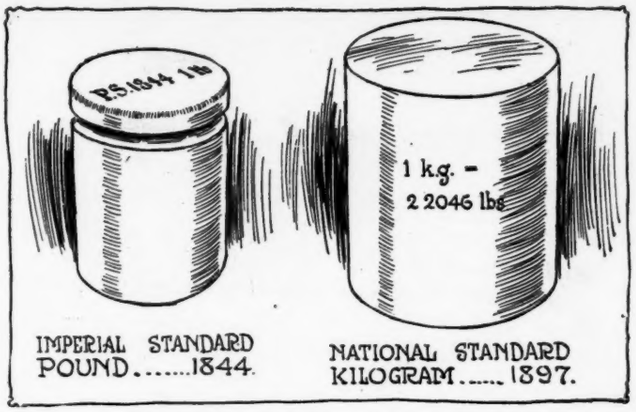
It was decided that after the arc had been measured by trigonometric methods, 1-10,000,000 part of this arc should be taken as the fundamental unit. The work was carried on in earnest by a committee of the National Academy. The actual meter, the name which was given to this fundamental unit and which is derived from the Greek word, *metron*, meaning, *a measure*, was finally determined in 1799 by the Commission and has an actual length of 39.37 inches.

From this time on until its adoption as compulsory in France the metric unit had a rather varied and stormy career. Of course, after the scientific determination of the unit, or meter, it only remained to have the system recognized and generally adopted throughout the country. Political conditions in France tended to delay the general acceptance of the new system. In 1,800 a decree was issued which stated that the decimal system would be put into effect the following year and a special nomenclature was proposed giving the various metric units French names. In 1812 the metric movement received a serious setback by an edict of Napoleon which established a system of measures termed *Usuelle* in place of the metric system as established in 1800, but which made use of the principles of the decimal system. Napoleon's law prohibited the use of any other save the *Usuelle* system. After its operation for a quarter of a century, the latter method of determining weights and measures was abolished by an act passed by the Chamber of Peers and the Chamber of Deputies in 1837. This decree provided that after January 1, 1840, all weights and measures should be of the decimal metric system and that any persons possessing any but these decimal weights and measures were to be punishable according to an article of the penal code.

Metric System Established

This act was the beginning of the metric system of weights and measures as now used in France. It has become firmly established and not only is it the compulsory and legal system in France, but also in the following countries: Argentina, Austria-Hungary, Belgium, Brazil, Chile, Germany, Greece, Italy, Mexico, Netherlands, Norway, Peru, Portugal, Roumania, Servia, Switzerland, Spain and Sweden. Its use is legalized in Egypt, Great Britain, Japan, Russia, Turkey and the United States.

The United States Government, after hearing considerable debate for and against the adoption of the system as the compulsory one in this country, in 1866 finally legalized its use.



Relative size of kilogram and pound. These are the exact shapes of these standards

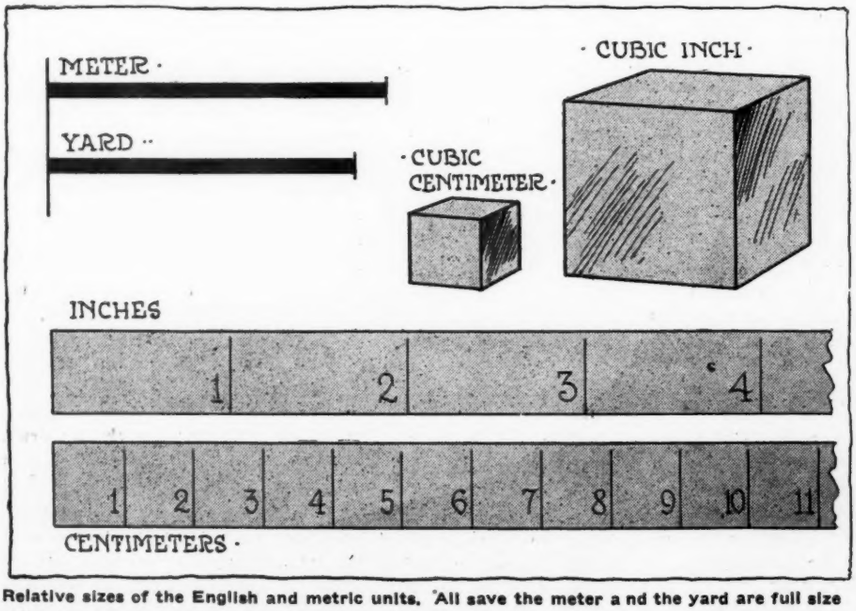
Congress on July 27 of that year approved, authorized and directed the Secretary of the Treasury to furnish each state one set of the standard weights and measures of the metric system, and with this start its use has grown considerably in this country and a large part of the public is continually urging its general adoption.

Recommended By Congress

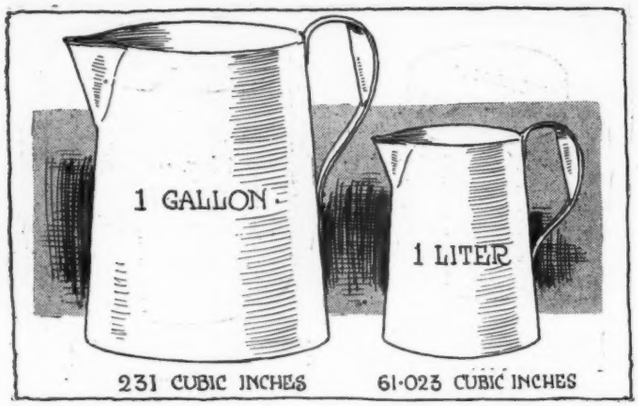
The progress of the system was brought out by the fact that Congress, in establishing a standard for measuring sheet iron and steel in 1893, expressed its standards in both the metric units and the common English units. One year later, Congress established the units of electrical measure, which are the international standards and based upon the metric system. In 1896 two reports were prepared by the House Committee on Coinage, Weights and Measures which recommended the French system for adoption. This recommendation was unanimously recommended for adoption, but did not pass a third reading. In 1901, 1902, 1903 and 1905 similar bills were proposed tending to have this country adopt as its legal standards for compulsory use the metric units. The Littaurer bill, however, which was formulated in 1905, provided only that the metric system be used in the governmental transactions.

Thus it will be seen that the question is a live one. For years the solons of England and America have wrestled with the problem of getting the people to realize the great advantage of such a decimal system once it is firmly established. It is from the engineers and manufacturing interests that the system receives its least support. Commercial considerations are their only reasons for opposing the system, which they know to be the logical one, and the adoption of which in this country would mean many dollars to them. They cannot see how the advantages to be gained from the use of these easier methods of length and quantity determinations would compensate for the great cost which the change would incur.

Scientists recognize the great advantage to be gained, but they do not consider the problem from the commercial standpoint. Lord Kelvin, the great British physicist and philosopher, was a leading exponent of the decimal system. He said, in one of his speeches, "I believe I am not overstating the truth when I say that half the time occupied by clerks and draughtsmen in engineers' and surveyors' offices—I am sure at least half of it—is work entailed



Relative sizes of the English and metric units. All save the meter a nd the yard are full size



Relative size of a liter and a gallon. The gallon equals nearly 4 liters

upon them by the inconvenience of the present farrago of weights and measures. The introduction of the French metrical system will produce an enormous saving in business offices of all kinds—engineering, commercial and retail shops.

"Nothing can be more convenient than the French metrical system for every kind of business and science. There is no case, large or small, in respect to measurement where the system is not satisfactory."

A brief explanation of the metric system is not out of place here. It is founded directly upon the decimal notation. The unit, as has been shown, is the meter. The base ratio is ten, and the subdivisions of the unit are either ten, one hundred, one thousand, times smaller than it. Correspondingly, the units above the meter are either ten, one hundred, one thousand, ten thousand, and so on, times greater. Thus if it is desired to change from one unit to another it is only necessary to change the number of ciphers, or the decimal point.

The table of decimal units will serve to show more clearly the progression from one unit to another by a ratio of 10:

10,000 meters = 1 myriameter
1,000 meters = 1 kilometer
100 meters = 1 hectometer
10 meters = 1 decameter
1 meter = 1 meter
.1 meter = 1 decimeter
.01 meter = 1 centimeter
.001 meter = 1 millimeter

The multiple prefixes employed are from the Greek and they apply to the multiples of the meter, while the submultiples are from the Latin. Thus, the Greek *deca* means ten, while the prefix *deci*, meaning one-tenth, comes from the Latin *decem*, meaning ten.

Volume and Surface Units From Length Units

The table given above is for lineal measurement only. The units for volume and surface are derived from length units, however. Thus, the unit of square measure, or surface is the square meter, from which the multiples and submultiples are obtained and are called square centimeters, square kilometers, and so on. Similarly, the primary volumetric unit is a cubic meter, from which are derived the cubic decimeter, the cubic millimeter, etc. The ratios of increase or decrease from the primary unit, however, are 100 for the square measure and 1,000 for the cubic. This follows from the fact that since the unit of length increases by the ration of ten, the unit of surface, which is derived from it must increase by the square of ten, or by 100. In like manner, the cubic unit must increase by the cube of 10, or 1,000. Thus the surface table becomes:

1 square kilometer = 1,000,000 square meters
1 square hectometer = 10,000 square meters
1 square decameter = 100 square meters
1 square meter = 1 square meter
1 square decimeter = .01 square meter
1 square centimeter = .0001 square meter
1 square millimeter = .000001 square meter

Likewise for the volume table. The primary unit for the measurement of capacity is the liter, while that for mass is the gram. The progression from these units both for increase and decrease is done in the same way as outlined for the units of measurement, volume and so on. The prefixes are the same. To facilitate the transformation from units of volume and capacity, the originators of the metric system took the liter to be equal to a cubic centimeter. This, however, has been declared to be slightly inaccurate, and, for scientific purposes, the International Committee defined the liter as the volume occupied by a mass of 1 kilogram of pure water at its maximum density and under normal atmospheric pressure. This was adopted in 1901 in the Paris general conference. While the actual unit of mass is the gram, it is so small as to be rather impractical for average mass determinations, and, for this reason, the practical unit is taken as the kilogram. In 1901 also the general conference defined it as the basis for mass determinations by stating that "The mass of the international kilogram is taken as unity for the international system of weights and measures."

Lord Belhaven's Suggestion

Tables for the conversion of units from the metric to the English system and *vice versa* are found in handbooks dealing with mathematical or engineering subjects, so that we are today able with considerable labor to translate into our own units any measures or weights which are given to us in the French system. We find that

1 inch = 25.4 millimeters.

which indeed is an awkward figure with which to deal. Half an inch will obviously equal 12.7 millimeters, while 1-4 inch will equal 6.35 millimeters, and so on. A very useful suggestion was made by the Rt. Hon. Lord Belhaven and Stenton, who suggested that, for the conversion of measurements which did not require extreme accuracy, it would be more convenient to assume the inch equal to 25.6 millimeters. This figure would then give us a table as follows, which is seen to be very easy to determine, and which is sufficiently accurate for all ordinary measurements:

25.6 millimeters = 1 inch
12.8 millimeters = 1-2 inch
6.4 millimeters = 1-4 inch
3.2 millimeters = 1-8 inch
1.6 millimeter = 1-16 inch
0.8 millimeter = 1-32 inch
0.4 millimeter = 1-64 inch.

In next week's issue of THE AUTOMOBILE *the opinions of the leading American automobile engineers on the relative values of Metric and English methods of measurement are given. The scientific superiority of the former is not denied by any one of them, but every expert admits that the sudden introduction of the French system would be well nigh impossible, owing to the tremendous investments now represented by tools adapted to operate on the English system and workmen accustomed to use them. Suggestions are made by some of the foremost engineers as to how a gradual introduction of the decimal system could be brought about.*

Legal News of the Week

Westinghouse and Bergdoll Differences Adjusted—Testing Mississippi Law—Republic Sues G. & J.—To Argue Dyer Suit

Efforts to Improve Pennsylvania's System of Licensing Chauffeurs—Suit Against Atlas Engine

Philadelphia, Aug. 19—A mutually satisfactory settlement of the legal proceedings recently instituted by the Westinghouse Machine Company, of Pittsburgh, Pa., against the Louis J. Bergdoll Motor Company, has been effected.

The litigation by the Westinghouse Machine Company was based on the terms of a contract entered into 2 years ago by which that concern was to build for the Bergdoll company 1,000 gasoline motors, to be delivered at certain specified quantities and times. After about three-fifths of the motors contracted for had been built a hitch occurred through the alleged failure of the Westinghouse company to make prompt deliveries of the balance, the Bergdoll company contending that by the delay in receiving the motors a consequent loss in automobile sales ensued, owing to inability to supply finished cars, and the latter company refused to accept or make payment for the balance of about 400 motors. The Westinghouse company brought suit to recover payment on the undelivered balance.

In the Court of Common Pleas No. 4, where the suit was heard, Judge Audenried awarded judgment for $104,000 to the Westinghouse company, which decision was promptly appealed.

By the terms of the settlement the original contract will be adhered to, the motors to be delivered to the Bergdoll company as required.

Will Argue Dyer Patent Suit

Argument of the legal proposition involved in the motion of attorney Jay N. Emley, representing the Palmer and Singer Manufacturing Company to reopen the order granted to the Enterprize Automobile Company for a decree *pro confesso* for infringement of the Dyer patents, will be heard by Judge Holt, of the United States District Court late last week.

Under the order of court a confessed decree was granted against the defendant in July and subsequently the defendant went into court and entered objection to the action taken, petitioning for another chance to carry on the case.

The position of the Enterprize company is that the various stipulations for delay in the court proceedings have applied only to postponement of the time to answer the complaint and not to the extension of time for pleading or demurring.

Good News for Taxi Creditors

Columbus, O., Aug. 19—Receiver McDowell, of the Columbus Taxicab & Service Company, of Columbus, O., in a partial report made to the court recently, showed that the concern is making a profit under his management and promises to pay off all of the debts of the company.

Republic Rubber Sues G. & J.

Indianapolis, Ind., Aug. 19—The Republic Rubber Company, of Youngstown, O., has brought suit in the federal court in this city against the G. & J. Tire Company, alleging infringement of patents and asking an accounting. It is charged that the G. & J. company has infringed on patents for the improvement of tires, granted in 1908 to Tod J. Mell, of Youngstown, O. While the G. & J. Tire Company has its factory and offices in this city, it is incorporated under the laws of New Jersey.

[The Mell patent upon which the action is based is the same instrument upon which the Republic company proceeded against Morgan & Wright last year. United States Circuit Judge Noyes in writing the opinion of the United States Circuit Court of Appeals for the Second Circuit held that the patent was invalid, having been anticipated by the Healy British patent. That opinion, however, does not prevent the complainant from proceeding against alleged infringers in another circuit. Among the reasons for such action may be the discovery of new facts in support of the patent. Prior actions in the United States District Court had been favorably decided toward the patent by Judge Hazel who sustained it generally and held that the defendants in the suit had infringed. Manufacture of the alleged infringing tires was not checked by the decree as the defense filed a bond and continued. The final score as between the parties stands at one decision each, the latter taking precedence of the former.]

Fighting Mississippi's License Law

Jackson, Miss., Aug. 19—With all the care used in staging a play, Mississippi's state license law has been broken. All details for the "crime" were arranged beforehand by the judge, the attorneys for each side and the man who agreed to be the victim. Representative men were stationed at agreed points as witnesses. After a last review of just what would be done, the court and the attorneys stepped to one side to let the martyr chug forth. H. C. Laurence, manager of the South State Street Garage, is the volunteer who broke the law. He toured the principal streets of the capital with his untagged car and on returning to the appointed place the forewarned policeman stepped out and made the arrest. As per agreement, a criminal charge was made and a hearing was granted immediately that the appeal to the Supreme Court, as had been planned, could be asked and allowed. Mr. Laurence was then given his release without bond.

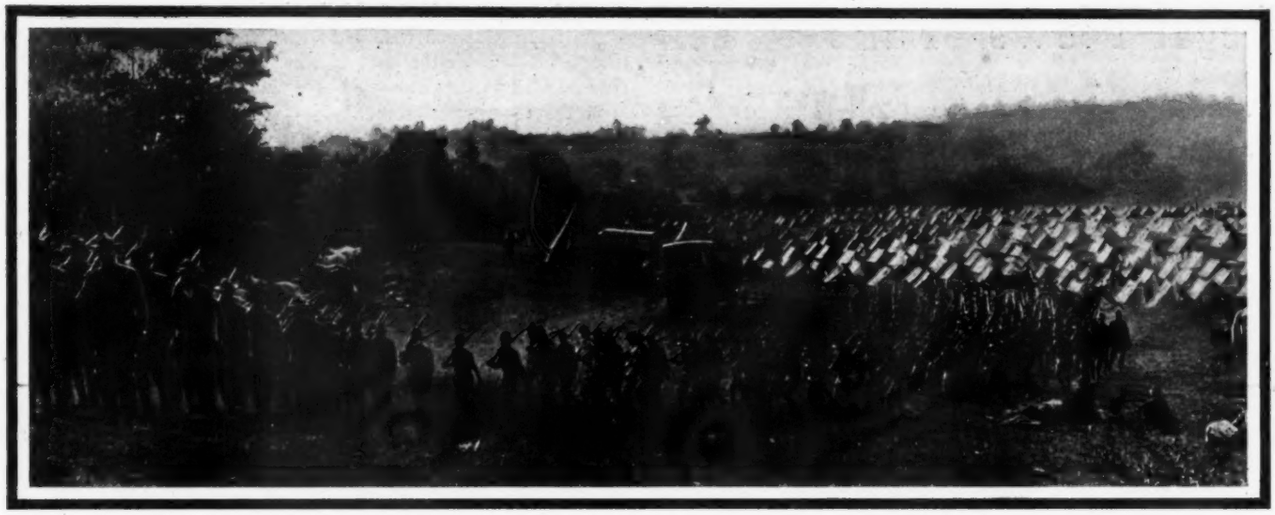
This case is the outgrowth of the action of the last session of the state Legislature when a law was passed providing for the assessment of a scale of charges based on the horsepower of the car.

May Amend Licensing System

Philadelphia, Aug. 19—Efforts are being made to have Mayor Blankenburg and Director of Public Safety Porter use their influence in having enacted remedial state legislation looking toward the abatement of the abuses claimed to have grown up under the present loose system of licensing chauffeurs. The assertion is made that under the present system of indiscriminate issuing of licenses there is no effective way by which the police can know the records of irresponsible persons whose reckless driving is a constant menace to the safety of the public.

Among the remedies suggested for enactment into law are legislation having for its object a thorough investigation of the applicant's character, with particular reference to his sobriety, a more thorough supervision of licensed chauffeurs and a closer tab kept of the records of chauffeurs to whom licenses are granted.

Indianapolis, Ind., Aug. 19—Suit has been brought in the circuit court by the Minnehaha National Bank of Sioux Falls, N. D., against the Atlas Engine Works, of Indianapolis, which is in the hands of a receiver. The action, also directed against Hugh H. Hanna, president of the Atlas works and the United States Fidelity and Guaranty Company, is to collect a judgment for $2696, upheld by the Indiana Appellate Court last April. The surety company gave an appeal bond for the Atlas company in the sum of $3,500.



Infantry of Red army leaving camp for battle line—trucks in middle ground followed the column with camp equipage

Motor Trucks Prove Worth as Army Supply Train

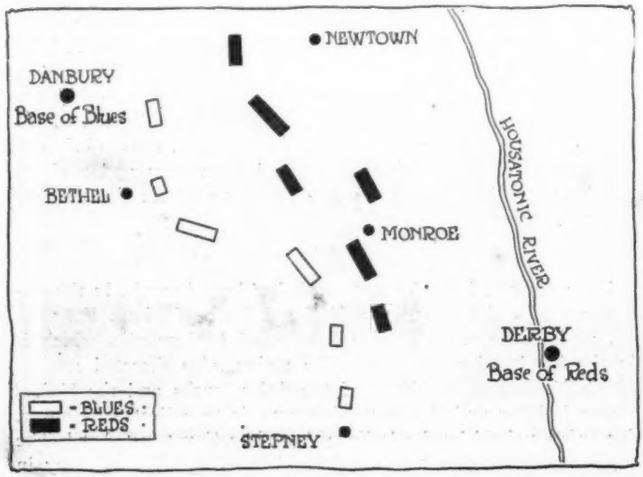
Maneuvers in Connecticut Under Bad Road Conditions Sound Taps for Mule—Mock War Operations Indicate Small Truck Is Better Than 5-Ton Vehicle Where Bridges Are Weak and Hill Trails Tortuous

THE good old army mule has heard the mournful sound of Taps. The army of the United States stands at the dawning of a new day—the day of motor transportation. During the military maneuvers in Connecticut last week, the automobile proved its case under conditions that more closely approximate actual war service than any that have gone before in the history of the country.

Approximately half of the work of supplying and providing for the fighting forces on both sides, the umpires, non-combatants and others connected with the maneuvers, roughly estimated at 20,000 men for 10 days, was done by means of automobiles.

They overwhelmed the mule wherever traction could be found; they covered distances that were outside the realm of possibility for the ancient beast; carried loads beyond the capacity of muledom and then went back and did it over again.

They proved that never again shall a mule train carry supplies from a main supply base to field depots. They indicated that in the near future the mission of the mule as a means of transport from the field depots to the fighting line shall end and that he will be displaced by the small swift motor wagon with a carrying capacity of about 2 tons.



Distance: Danbury to Stepney, 21 miles; Derby to Newtown, 16 miles

They showed impressive qualities to the regular officers who were in charge of transportation and convinced all but a few ultra-conservatives that the mule already had passed along to his reward.

A striking feature of the situation is shown in the experience of the Blue army, although its conclusions apply equally to the Reds or any other fighting force anywhere. The total amount of quartermasters' and commissaries' freight amounted to 961 tons. This was composed about half and half of rations and forage. Of course, the forage was destined for the calvary and artillery horses in large measure, but there were 220 mules that had to be maintained and every pound of hay and grain destined for their use had to be carried in some way. With the elimination of the mule and the decline of the cavalry arm of the military service, the forage supply becomes a small matter for future consideration, representing the keep of the artillery horses.

Traction First Road Quality

Of course, the road is a part of the automobile. In such hills as staged the scene of the campaign, cross-country work was out of the question as far as the motor truck was concerned, but this fact should be carefully borne in mind: it was also beyond the capacity of any mule that ever lived.

It is conceivable that in a flat country mules could go across the fields and so could the trucks, but the experience in Connecticut proved that mule-drawn wagons are on a par with motor trucks when it comes to traversing high ridges—for neither could do it.

A concrete example of the effect of the showing made by the trucks is contained in the remark made by the driver of an army mule team to the representative of THE AUTOMOBILE while riding to the front with a load of hay. The man watched a file of trucks

pass with their loads and then turned and said: "Say where can a fellow learn how to drive one of them things?"

The motor equipment was picked up anywhere and everywhere. A few of the automobiles are owned by New York and Massachusetts, but the total number so owned was only five or six at the outside. The rest were rented, donated or commandeered on a time basis. Some of the owners were not much delighted with the arrangement when they say how tremendously their trucks were being pushed. The equipment included many of the well-known types and makes, as appears in the tabulations herewith.

The service of the trucks was largely that of transferring supplies from the base to the field depots and from the field depots to the line of battle or encampment. The Blue army, with a longer line to cover, delivered an average of 43.1 miles per truck per day according to the best figures available. The Red army figures were slightly below this average because of the larger motor equipment and the shorter line to be served.

Blue Army Haul 21 Miles

The Blue base was at Danbury during the crucial period of the campaign. From there the quartermaster's department served four field depots behind the line. These were located roughly at intervals of 5 miles in a line almost south from Danbury, the most southerly being in the rear of Stepney. The chief depot for forage was at Bethel, 5 miles southeast of Danbury and a branch of the railroad took care of the bulk of the hay, grain and wood destined for the fighting units in the field to the east and northeast.

From these four depots and also directly from the base supplies of all kinds were conveyed by field trains to the camps of the military organizations. The average distance from the base to the field depots on the Blue side was 12 1-2 miles and from the depots to the front 7 1-2 miles. This was arranged so that the mule teams could cover it, as the plans of the campaign were made on the basis of the mule and not the automobile truck.

On the Red side the base, or one of them, was at Derby and the distribution was from Newtown on the north to Monroe and Stepney on the south. The average haul to the field depots was 7 1-2 miles and to the front from the depots 5 1-2 miles.

The equipment of the Blues included twenty-three trucks and that of the Reds was about thirty at its maximum strength. On the Red side the available records were fragmentary, but among the vehicles in service were nine Whites, ranging from 5 tons capacity to 1,500-pound wagons; four Packards of 5- and 3-ton sizes; one G. M. C. of 5 tons; two Saurers of 4 1-2 tons; several Peerless trucks; Mais, two; Pierce-Arrow, several; Simplex, Stoddard-Dayton, Alco and perhaps others at various times.

Five of the White trucks are owned by the military arms of the states of New York and Massachusetts, the others were furnished by factory branches or hired from private owners. The same may be said for all the rest of the equipment.

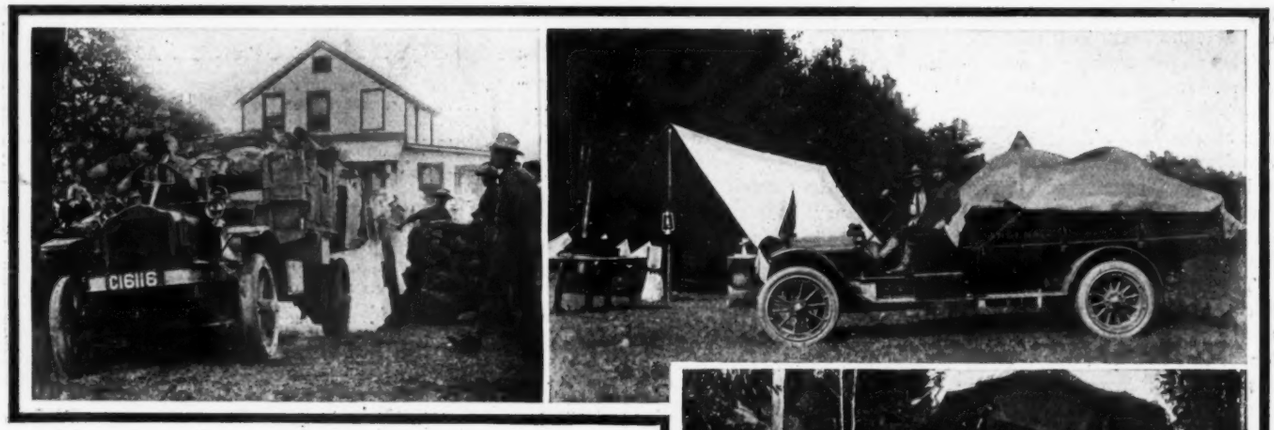
The biggest truck used was a 10-ton Pierce-Arrow, which made the trip from the factory at Buffalo in 4 days' running. This truck had to be unloaded many times on account of weak bridges and its service was limited in the Connecticut hills because of its weight.

Transportation, as it applied to the quartermaster's department of the Blue army, involved the problem of moving 961 tons of freight. Results are always required of the quartermaster and the results attained by the officers entrusted with that post by the Blue army were largely reached by the use of the automobile truck.

MOTOR EQUIPMENT OF BLUE ARMY

Truck.	Organization.	Size.
G. M. C.	Quartermaster	5-ton
G. M. C.	Quartermaster	3 1-2-ton
G. M. C.	Quartermaster	3 1-2-ton
G. M. C.	Quartermaster	2-ton
Packard	Second N. Y. Brigade	3-ton
Packard	Second N. Y. Brigade	3-ton
Packard	Second N. Y. Brigade	3-ton
Packard	Second N. Y. Brigade	2-ton
Alco	Second N. Y. Brigade	3-ton
Sternberg	Second N. Y. Brigade	2-ton
White	Second N. Y. Brigade	3-ton
Packard	Provisional Artillery	3-ton
White	Provisional Cavalry	3-ton
Gramm	N. Y. Engineers	3,000-pounds
Saurer	N. Y. Engineers	4 1-2-ton
White	Forwarding Hospital	1 1-2-ton
White	Forwarding Hospital	1 1-2-ton
Decatur	First N. J. Brigade	2-ton
Alco	First N. J. Brigade	3-ton
Kelly	First N. J. Brigade	3-ton
Kelly	First N. J. Brigade	3-ton
Federal	First N. J. Brigade	2-ton
White	Both Armies	3-ton
Panhard	Headquarters	Pleasure Car
Mitchell	Headquarters	Pleasure Car
Cadillac	Headquarters	Pleasure Car
Cadillac	Headquarters	Pleasure Car
Franklin	Headquarters	Pleasure Car
Hudson	Headquarters	Pleasure Car
Stevens-Duryea	Headquarters	Pleasure Car
Pierce-Arrow	First Cavalry	Pleasure Car
Lozier	Second Cavalry	Pleasure Car
Matheson	Second Cavalry	Pleasure Car
White	Umpire	Pleasure Car
White	Official	Pleasure Car
White	Official	Pleasure Car

White 3-ton truck delivering commissary supplies to New York Blue brigade near Bethel—Part of the load has been left with regiment shown in rear



Baggage trucks only required traction

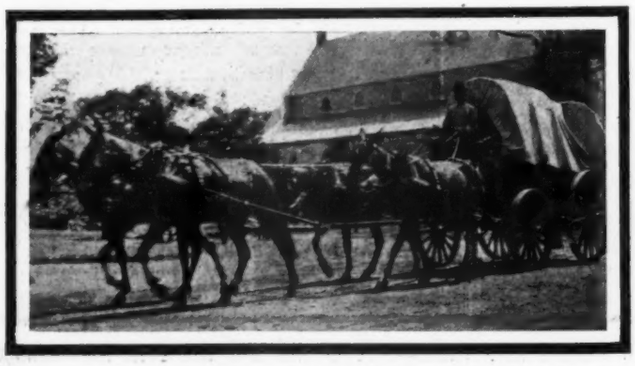
In fact, the troops of this army were short of mule-drawn equipment, according to the army regulations and the deficiency was cared for by trucks, propelled by gasoline power. There were twenty-three of them with the army, according to a careful canvass of the situation, but only four were directly connected with headquarters.

Service of Trucks Satisfactory

Broadly speaking, the services rendered by the trucks was satisfactory. They were mostly chosen at random, and were picked up wherever available. Nineteen of the twenty-three were assigned to the various military organizations as field trains. One of them was equipped as an ambulance. Still another served both armies at different times, thus leaving the actual number of trucks connected with the distribution of rations, baggage, forage and wood as seventeen.

The plan of supplying and providing for an army in the field was explained in THE AUTOMOBILE by Captain-Quartermaster Barker, of the United States Army, in charge of the supply depot for the Blues at Danbury, Conn.

There are two main divisions of the distribution. First, there is a general supply depot, located at some distance in the rear of an army. From this supply depot supply trains are run to various points in the rear of the fighting organizations. The supplies are transferred to the field trains of the fighting units which convey them to the quartermasters and commissaries of the regiments, troops or batteries. The total haul from the central supply depot to the line of battle must be less than 25 miles if mules are to serve for drawing power and if such perishable freight as fresh beef, for instance, is to be a portion of the loads. This limit is definitely placed by reason of the fact that a four-mule team, drawing a wagon loaded with 3,000 pounds of freight, can make only 2 1-2 miles an hour for a maximum of 10 hours a day. The army regulations contemplate the use of the mule exclusively for this service.



Last appearance of the good old army mule

How the Massachusetts Reds received their daily rations
Big Saurer proved too heavy for conditions of highways

The central supply depot is located as close to a railroad line as the circumstances will permit. The haul to meet the field trains of the regiments is usually laid out over country roads, but the route of the field trains to the battle line or the encampment may be over any course that will give traction. Almost always roads are available for such purposes, but sometimes the field trains have to go cross-country.

Functions of Supply Train

The result to be attained is a continuous supply of food, ammunition, forage, etc., in one direction and accommodations for wounded men and unavailable material in the other.

The actual experience of the Blue Army was about as follows: During the latter days of the campaign, the main supply depot was established at Danbury on a branch line of the New York, New Haven & Hartford Railroad, having connections with the sources of supply. The fighting line was established along the Housatonic River and as it retired westward the hauls became shorter and shorter until the left wing of the army rested upon the supply base. The railroad extended to Bethel, and the road was used in place of the ordinary supply train in a wide sense. The four trucks assigned to the quartermaster were auxiliary to the railroad. The main distributing point for forage was Bethel and the trucks were utilized for the longer hauls to the field trains of the regiments further to the right of line.

They were used almost continuously and averaged 48.7 miles a day, including the time two of them were stuck in the ditch, 3 miles south of Bethel during Tuesday night. This mishap was the result of unskillful handling, pure and simple. There was no other element in the situation. The drivers allowed their engines to run dry and one of the G. M. C. 3 1-2-ton trucks was laid out as a result. The other suffered to some degree from the same cause, but it was a skid from the road that could have been prevented by an experienced chauffeur that put it out of service temporarily. When the first car had cooled off, the 5-ton G. M. C., which was lightly loaded, pulled it and the skidded car from the ditch. Neither was materially damaged.

On Thursday the haul from Danbury to the field train of the regiment at the right of line was fully 20 miles by road, but the trucks covered the ground as required carrying an overload ranging up to 25 per cent. This, of course, does not apply to the 5-ton vehicle, which was always underloaded when its itinerary included any of the numerous weak bridges with which the country abounds. It was equipped with block tires on its driving wheels and except for its size which seemed excessive under the specific operating conditions performed well.

The service was tremendously hard on tires and it is certain that the tire equipment of every truck engaged suffered at least 200 per cent. as compared with the normal wear of the same mileage under normal conditions. The gasoline consumption of the quartermaster's trucks was about 3 1-2 miles to the gallon on the general average. The average mileage made by the quartette in 10 days was 487 and the total wagon mileage delivered was 1,948, based upon the performance of 8 days of the maneuvers.

No Cross-Country Work Attempted

There was no cross-country work attempted by any truck connected with the army, except where the cars left the roads to enter fields for the purpose of delivering freight. The road conditions on the general average were strenuous. The grades ranged up to 45 per cent. and there were nine distinct ridges of hills where the degree of inclination was in excess of 20 per cent. There were eighty-two bridges and culverts on the lines of communication in the rear of the Blues. Some of these were so weak and rickety that they gave way beneath the heavier trucks. An overloaded Sternberg went through a bridge near Stepney; a Packard with 4 tons of freight broke down a culvert at Redding Ridge, and another Packard in seeking to make a detour around a shaky bridge structure was mired down in a swamp and stayed there for several days. This latter car was assigned to the Provisional Artillery regiment.

The Second New York Brigade had for its field train seven automobile trucks. The cavalry and artillery were served to some extent by this equipment as well as two trucks specially assigned to that work. The New Jersey brigade had five trucks and there were four others assigned to the engineers, hospitals, etc. The remainder of the transportation was represented by

Delivering rations to Blue company commissary

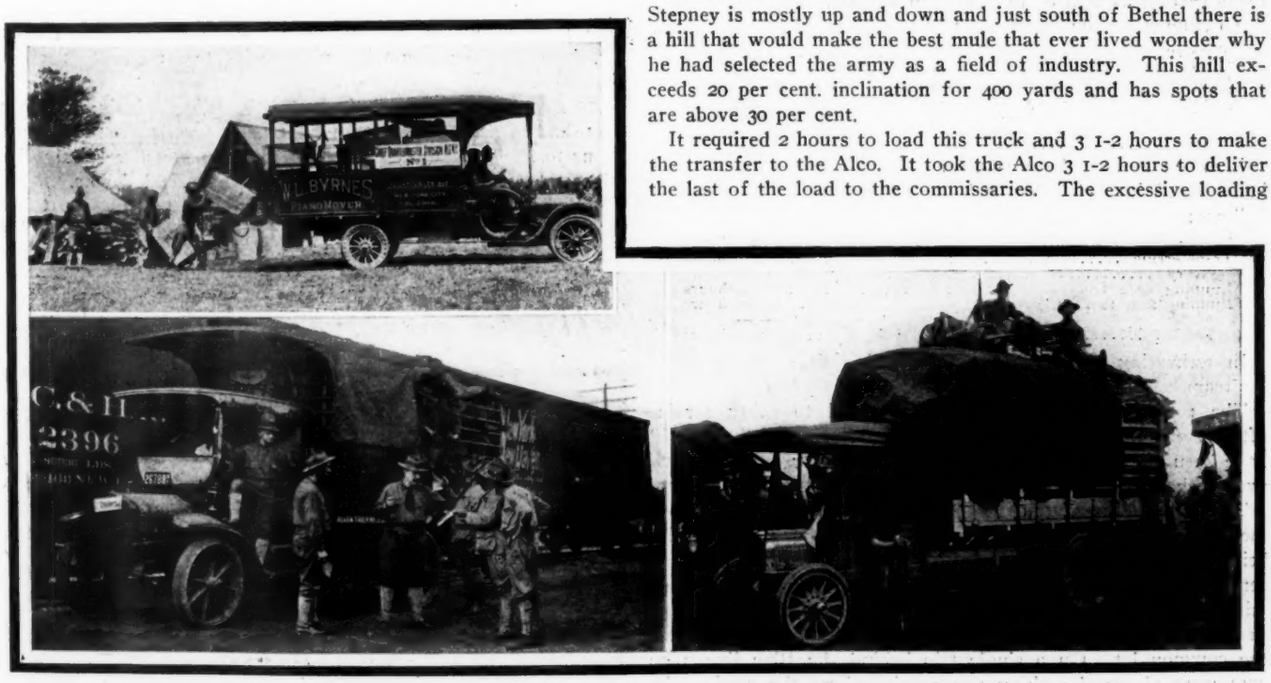
mule and horse-drawn wagons, this type of transportation being used exclusively by the United States regulars. All told, the Blues had twenty-three trucks and fifty-five teams. This is about half the amount that would have been required by the same number of organizations on the basis of full war strength, reckoning also a full 50 per cent. allowance for the use of the railroad between the main base and the field bases.

Reckoning the average truck used by the Blue army at about 3 tons carrying capacity and estimating the general average daily mileage at 43.1, half of which would be under load, the truck equipment alone would seem to have had sufficient capacity to handle all the freight. But the transfer at the field depots and duplication of service cut down the actual figures to approximately three-quarters of the total service performed.

How the Trucks Carried Beef

As an instance of the work of the trucks the following may be cited: On Thursday it was necessary to transfer 3,000 pounds of beef from Danbury to the field supply depot behind Stepney. The meat was loaded upon one of the 3 1-2-ton G. M. C. trucks at Danbury and with sufficient other freight to make up 4 tons was delivered 21 miles from the main depot in a run of 3 hours. There, the load was transferred to a 3-ton Alco and was delivered to the commissaries of two regiments 4 miles to the eastward in less than 1 hour. The country about Stepney is mostly up and down and just south of Bethel there is a hill that would make the best mule that ever lived wonder why he had selected the army as a field of industry. This hill exceeds 20 per cent. inclination for 400 yards and has spots that are above 30 per cent.

It required 2 hours to load this truck and 3 1-2 hours to make the transfer to the Alco. It took the Alco 3 1-2 hours to deliver the last of the load to the commissaries. The excessive loading



New York troops had best motor equipment—This group of pictures shows three phases of military service, loading, loaded and unloading

Five makes and styles of trucks, mule-wagons and pack animal starting from a camp ground behind a column of Blue infantry

G. M. C. 5-ton truck with a fair load of forage

and unloading time used was typical of the whole experience and may be charged in a measure to the varied character of the loads carried as well as to unskillful loading.

To summarize the experience:

Time running from base to field depot	3	hours
Time running from depot to front	1	hour
Loading time at base	2	hours
Transferring load	3½	hours
Time to last delivery	2½	hours
Total	12	hours

If mule teams had been used for the service three teams would be required in each relay and the result would have been as follows:

Loading time at base	3	hours
Transferring	5	hours
Delivery	2½	hours
Running time from base	8⅝	hours
Running time to front	1⅝	hours
Total	20½	hours

In estimating the loading and unloading time, the labor of the team crews alone is contemplated.

The motor trucks immediately proceeded to other service after completing this trip, but if mules had been used they would have been all through for the day, at least after a 21-mile pull over such hills.

The pleasure cars attached to the army completely displaced the horse courier. They averaged 90 miles a day and besides being used to transport the aides of the commanders, they served in the quartermaster's department to carry all sorts of miscellaneous loads. On account of the sharp rock to be found practically everywhere on the maneuver field, tire trouble was the common lot. On a single trip behind the Blue line, nine cars were observed making tire repairs along the road. The cars averaged rather less than 6 miles to the gallon of gasoline.

Extreme figures of service, as far as reported, were an average of 72 miles a day by the 3-ton Packard assigned to the Forty-seventh New York and a maximum of 82 miles made by an Alco 3-ton truck. Among the pleasure cars, the Matheson scored 200 miles in one period of 24 hours.

As a general thing the officers were pleased with the showing of the motor equipment and it was freely predicted that the day of the mule had passed.

Details of the experience of the Reds showed similar conditions, a trifle less strenuous.

Some Lessons of the Campaign

THE performance of the automobiles connected with the two armies was the most pressing subject of thought, if not discussion, among the Regular Army officers assigned to the campaign.

Their conclusions, guardedly expressed, are that the new element introduced into American military science will force a complete readjustment of war plans to conform with it.

No more unpromising field for the motor truck could be found than the hilly country chosen for the maneuvers. Horse and mule equipment was purposely left inadequate so that a severe test of the automobile under adverse surroundings might be made.

The conclusions of a majority of the officers, including those who had to deal directly with the trucks, are that the truck has come to stay; that it is still imperfect; that it will certainly displace the mule for handling supply trains to field depots.

The radius of action of the truck is from 20 miles up to 50 miles, making a single round trip of from 40 miles to 100 miles in a day. This difference depends upon road conditions and the necessities of the particular case.

Under present road conditions and particularly with reference to the strength of bridges, big trucks are unavailable. When

Automobile trucks loading commissary at Bethel

The baggage was often loaded into trucks in less than 10 minutes—The trucks had no difficulty in holding their places in column

roads and bridges have been improved, the limit of size will increase.

The present 5-ton truck is too heavy for use on the Connecticut bridges.

The overloaded 3-ton truck is at practically the same disadvantage.

The proper size for general army use should be less than 3 tons capacity. The 2-ton truck and the 1 1-2-ton truck and the 1,500-pound wagon did yeoman service.

Great speed is not necessary in army service. The mule's radius of action is not more than 12 1-2 miles maximum and his speed is 2 1-2 miles an hour. The average 3-ton truck extended its radius of usefulness to over 21 miles and made from 9 to 12 miles an hour.

The mule can be worked a maximum of 10 hours a day; the truck can be worked a maximum of 24 hours a day.

The mule must rest and feed; the truck can be gone over with a pair of spanners and a can of lubricant while it is being loaded.

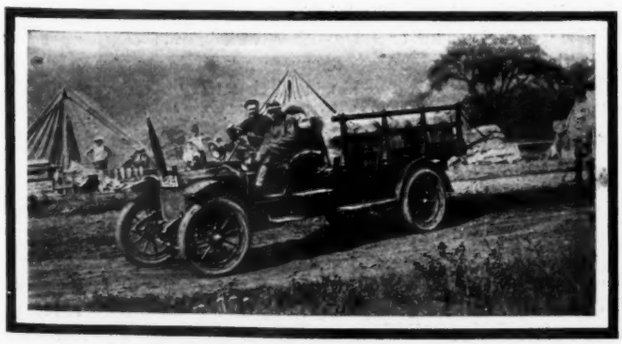
The mule team can haul a 3,000-pound load 12 1-2 miles and return with the empty wagon in 1 day; the truck can haul 6,000 pounds over the same route twice in a day without undue strain on the mechanism.

Truck Equals Four Mule Teams

Therefore, the truck can do the work of four mule teams under ordinary conditions and if both equipments work at pressure, the truck can do the work of eight teams.

In hauling perishable freight over long distances, the truck can do satisfactory work beyond the radius of action of the mule.

The mishaps encountered by the trucks during the maneuvers were due in large part to unskillful handling, lack of knowledge of the roads and to their size.



There were 11 White trucks of this type engaged

Mais trucks were employed on the Red side

Solid tires, dual on the drivers, gave the best service, although the pneumatics used by some of the smaller wagons gave a good account of themselves. One truck was equipped with block tires. One had pneumatics filled with composition rubber.

One truck was laid out because of tire trouble, a small Gramm machine which commenced service with a worn left rear tire. This truck was much overloaded and the tire gave out after 6 days of grinding on the rocks.

The tire cost of the campaign will never be known with accuracy because the tires in service were in various conditions at the time the campaign opened. But it is known that the overloading, overworking and overspeeding that was done all around will make itself apparent a little later in premature replacements.

The conclusions of those in position to observe the performances of the trucks are as follows:

The installation of automobiles will cut down the amount of forage and freight to be handled by the quartermaster's department by almost 30 per cent. through the elimination of provision for the mules.

When the cavalry arm is decreased in size, this item may be reduced by 50 per cent.

Trucks must have some kind of a road to operate upon. The better the road, the more satisfactory the service. The only cross-country work possible for the truck under the conditions in Connecticut was to leave the road a short distance to deliver its freight. Even this was fraught with considerable difficulty. Therefore, the conclusion reached is that while the truck has demonstrated that the mule must go as a means of transport from the base to the field depot, the mule will have another chance to show its fitness in the field trains.

This does not mean that the mule has shown superior quality in the field trains, but simply that the trucks available for that

New York troops had the only automobile ambulance

Forwarding hospital used two trucks of this type

kind of service could not go across country quite as certainly as the animals.

Trucks specially designed for this service may answer the question, but it is problematical whether the need of such a type is sufficiently important to call for much attention. It is self-evident that no automobile can be made that can follow a mule loaded with a pack through a pathless thicket or on a deer-trail across the side of a canyon.

In ordinary country where there is traction for the driving wheels, the truck of today can go almost anywhere any other wheeled vehicle can show the way.

What the Experts Suggest

Every truck in army use should be fitted with a set of ratchet sprags to prevent it slipping backward. An Alco truck in the campaign slipped back into a stone wall and broke its gasoline tank. The use of such a device might have saved one G. M. C. and one Packard truck from mishaps that put them out of commission temporarily.

After a rain, especially in the hills, traction is precarious. When the automobile trucks of the armies were wriggling around on the hills after the rain of Tuesday, several of them slid into ditches and could not get out without outside assistance. It is suggested that some means for locking the differential, by bolt or otherwise, be adopted generally so that a ditched truck with one wheel on tractional surface can help itself back to the road by its own power.

The trucks also should have a very low gear for use in such going, or worse, as that met with in the war.

Some suggestions were also made as to the advisability of using a truck with the drive on all four wheels and steering by both sets of wheels. This was the idea of some of the officers who were seeking to find the type of gasoline car that might displace the mule in the field trains.

Another suggestion that was probably the result of experience with poor traction after the rain was that a drum, about 10 inches in diameter, should be placed on one of the driving hubs, to be used in emergencies for extricating the truck from ditches, broken bridges or swampy land, but particularly the former. With two turns around the hub drum, a stout rope, one end of which can be fastened to some immovable object and the other held taut by a man, will probably prove of much service in case of lost traction, the engine of the automobile furnishing the power by which the car may be replaced upon firm going.

The most severe criticism of the truck in military service was delivered by a few of the older and more conservative officers. The head of the Blue army's transportation at headquarters had four trucks of various makes under his personal direction. They were all of 5 tons capacity and as a result proved too much for roads and bridges. He said that he wished he had a full equipment of mules in place of the trucks.

As has been stated, results are the main thing to be attained in army transportation and it is obvious that mules are better than 5-ton trucks if the mules can deliver their freight and the 5-ton trucks can not. If 2-ton trucks had been installed in place of the big fellows that broke the bridges, the chances are that the opinion of the Blue army's transportation head might been modified.

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To Adopt N. A. A. M. Truck Standards

There are numerous indications that the commercial motor vehicle standards recommended this year by the N. A. A. M. will be freely adopted by manufacturers, both members and non-members of the association. Already some of the leading companies have given the word that the new models shall conform to the speed ratings, and frame widths and lengths recommended, and information is now at hand that twenty-two companies have adopted the standard truck warranty approved by the association June 5, or have expressed their intention of doing so, and will incorporate it in their new catalogues to be prepared this fall.

The warranty has been the subject of careful study on the part of practically all the makers since it was published and it is evident that it meets with general approval, as many manufacturers have expressed the hope that it will be adopted universally without change. Only two criticisms have so far been offered—one being that for electric vehicles the reference to ignition apparatus, gas tanks and generators is superfluous, which objection has been overcome simply by omitting these words; and the other the limitation of the warranty to 90 days.

The latter point has developed an interesting feature that illustrates plainly how the work of standardization can give stability to the industry. Up to the present it has been the practice of different makers to warrant their vehicles for different periods—some for 90 days, some for 6 months, others for 1 year and several for longer periods, up to 7 years. "We have made it a practice," says one manufacturer, "to warrant against defects in material and workmanship for 1 year and would prefer to stand back of our output in the broadest possible manner, as we are using, and expect to use, only the best of material and workmanship in the construction of our trucks. If, however, a large majority of the association feel that a 90-day warranty is better for all concerned, we will join in the matter.

The general manager of another well-known company says: "At the present time our guarantee reads for 1 year, but we believe this is entirely too long and that the 90-day guarantee is all right. We are not members of the N. A. A. M., but we shall be only too glad to co-operate with it in establishing a standard guarantee covering motor trucks."

The reason why a 1-year guarantee is too long is well illustrated by the experience of a company in the South, which is related as follows by the general manager:

"Last year we took up the manufacture of 1 1-2, 3 and 5-ton trucks and were forced, on account of Northern competition, to give 1 year's guarantee on all trucks sold. This has proven so unsatisfactory that we have practically suspended the manufacture of trucks."

Car Painting for the Tyro

Knowledge of Value to the Owner Who Contemplates the Renovation of His Automobile

Constituents and Proper Proportioning of Paints and Varnishes—How to Do the Work Well and Cheaply

TO BE qualified to get the best service from the paint and finish upon his car the owner should first of all be informed concerning the ingredients which compose the structure of pigment and varnish.

It may not be essential to his welfare, or to his pecuniary advantage, to know how to apply the various coatings, or to manipulate the manifold processes which underlie all this devious work of developing the finished structure, but to be informed in detail of the composition of the materials joined together on the car is great gain.

Getting it fixed in a general way in his mind, the car owner will be enabled to enforce a system of caretaking in every way calculated to prolong the life of the finish.

The first or preliminary coat is, in the main, composed of raw linseed oil, to which is joined a light body of some filling pigment—white lead, lampblack, yellow ochre, Venetian or Indian red. Raw linseed oil has been vouched for as the life of the paint, so that in the priming the oil is the essential thing and the pigment the non-essential.

Essentially, too, this coat should be well worked and brushed into the wood or metal so that a uniform distribution of material and the proper penetration are assured.

Less Oil in Paints for Metals

The metal surface, sheet steel or aluminum, as may be, requires a primer containing, as a matter of necessity, a smaller proportion of oil. Metal will not absorb and take care of as much oil as wood, hence the priming coat will need to contain proportionately less oil and proportionately more thinning and drying material when designed for metal.

After the priming coat comes a pigment regulated to go firm and secure over the priming. This coat may be made up of white lead and some coloring pigment thinned in three parts raw linseed oil and five parts turpentine. In speaking of turpentine we mean, of course, pure turpentine, the unadulterated product of the living pine. This is the thinner *par excellence*. It thins the paint or color and assists the painter to spread the pigment over the surface. Having accomplished this, it evaporates and leaves the pigment in the full possession of all native and original properties.

Adulterated turpentine, along with many of the turpentine substitutes, gives both the painter and the car owner trouble in various ways. Turpentine adulterated with some one of the various forms of petroleum imparts to the paint or the color an uncertain drying property, this lack of uniformity working harm to the durability of the paint structure. Thus trouble of a serious nature is visited directly upon the car owner.

Turpentine substitutes are often fearfully and wonderfully made, some of their component parts being grease and acids chemically acted upon and converted into a thinner, in connection with a fluid body which, while having many turpentine characteristics, is lacking in those properties indispensable to a thinner of the right kind.

Not infrequently the car finish goes to premature decline without apparent cause. If the chemical history of all things entering into the paint structure could be known, many of the early deaths might be traced straight back to spurious or substitute turpentines. Wherefore, concerning the use of turpentine the car owner may well write into his painting specifications a demand for the pure article.

Raw linseed oil is likewise a paint medium upon which the car owner in company with the painter should look with grave concern. Raw linseed oil is scarce, and the temptation to extend the volume by using an oil that is in no way related to linseed is correspondingly great. Adulterated raw linseed oil is difficult to detect except through the poorer paint service obtained from its use. About the best means of protection to adopt, all things considered, is that afforded by buying direct from a concern entirely above the business of dealing in or handling the impure oil.

With two coats of priming and filling-up material for the body surface, the next step takes us to the roughstuff. This is a coarse filler mixed with equal quantities of coach japan and rubbing varnish, and thinned with turpentine to the proper brushing consistency. Four or five, and even six coats of this filling-up pigment is put on at the rate, preferably, of one coat per day. After several days this foundation of roughstuff is rubbed down to a smooth and level condition with blocks of rubbing brick, otherwise known as artificial pumicestone. A good deal of skill and thought must necessarily go into this work, for right at this stage the ideal surface to finish upon is actually made possible. If the surface in rubbing is scratched and gouged no amount of varnish and no amount of skill in putting the varnish on will make up for the defects. If the surface be poorly rubbed, the ultimate finish will be poor. While varnish is a beautifier and a protector of the surface, it is likewise a graphic delineator of all surface imperfections. All of which explains the wherefore of making every lick count for good in rubbing the roughstuff.

Following this smoothing and leveling-up process the surface is lightly sandpapered and dusted off and two coats of color applied. In some cases one coat of color is deemed sufficient, a coat of varnish-color being flowed over the single coat of color. It all depends, or chiefly depends, upon the color and what the requirements of the work are. In the event of using some of the lake pigments, all of which are very transparent, the requirements are one coat of ground color, one coat of the lake mixed and applied as a flat color, and then one coat, or two, if the surface conditions demand it, of the lake mixed with varnish.

When dry, the gloss is beaten off with a soft sponge wet and dipped in pumicestone flour, and a coat of rubbing varnish containing a bit of the glaze or lake color is flowed on. In due time this coat is rubbed, and a second coat of rubbing varnish is put on. For first-grade work perhaps another coat of rubbing varnish is used. If striping or ornamental lines are employed they should be put on before flowing on the last coat of rubbing varnish. Comparatively little ornamentation is now done on the car, but this little is done exceedingly fine, as a rule.

The last coat of rubbing varnish, when dry, is rubbed very carefully, then washed up and the body-finish varnish applied. Within the last year or two an automobile line of varnishes has been perfected which dry very quickly in the course of a night in some cases.

No Water on Berlin's Streets

For some time a special soap-and-oil emulsion has been used for sprinkling the streets of Berlin. It is mixed with water in the proportion of 1 to 100, and one sprinkling every 4 to 5 weeks secures freedom from dust, to a certain degree, even on the streets with the densest traffic. As no sprinkling is done in winter, six sprinklings per year is the rule, and the cost of this method, which is continued and therefore seems to be satisfactory, is only 1-7 of what the cost of the old system of sprinkling with plain water would be. When the oil used is rich in asphaltum a certain saving is effected, because in that case the streets are found in better condition at the beginning of the following season and require less sprinkling.—From *Automobil-Betrieb, medio* July.

In the Export Field

Opportunities for Foreign Sales of American Automobiles Set Forth in Special Consular Reports

Canada and Great Britain Our Chief Outside Markets, Followed by France, Mexico and Italy

FOREIGN Markets for Motor Vehicles is the title of a compilation of special consular reports just issued by the Bureau of Manufactures of the Department of Commerce and Labor, covering the field up to the end of 1911. The book is designed to be of assistance to American automobile manufacturers and is of such a character that makers of motorcycles and of automobile accessories may also gain an idea of the opportunities for business in foreign lands. The number and values of the automobiles and parts exported to and imported from the various countries during 1909, 1910 and 1911 are given in tabular form. The book, which comprises 143 pages, takes up the western hemisphere first and then proceeds to give the trade conditions in the different countries in Europe, Asia, Africa and Australasia. At the end of the book is a list of the catalogues, pamphlets, etc., on file in the Bureau of Manufactures which may be borrowed by American automobile manufacturers interested in the export trade, together with a list of 163 reports received from consular officers which it was found impracticable to publish. A very brief digest of the book, taking up the countries in order, is as follows:

Canada is the chief market for American automobiles, purchasing in the fiscal year of 1911 almost 40 per cent. of American automobile exports. The sale of American cars has increased swiftly but steadily and promises to continue. Machines in most general use are of medium size. The main centers of automobile activity are the large cities, such as Ottawa, Quebec, Montreal, Toronto, etc., but the rapidly developing western districts are fast absorbing American automobiles. A number of American factories have established Canadian branches which are turning out cars in such numbers that the demand in the Dominion is not only fairly well supplied, but there is also a sufficient surplus of machines to permit of exporting in considerable quantities. The various officials reporting from Canada, however, estimate the number of families possessing sufficient means for the purchase and upkeep of automobiles to be considerably in excess of those at present owning motor vehicles.

Mexico Has No Car Factories

No automobiles are made in Mexico, every machine used being imported. The City of Mexico is wealthy. It is the distributing center of the republic and the buying center for the principal mining districts. All the streets are asphalted and most of the roads leading out of the city are macadamized. The American colony in Mexico City numbers about 10,000 persons, most of whom are well-to-do. Considering these general conditions, it is easy to see that there is a good market for automobiles, which, however, is already well supplied and extensively worked. There are more American cars in use than European, the medium-grade car predominating. Practically the same conditions obtain in Aguascalientes, Chihuahua, Durango, Guadalajara, Monterey and other Mexican cities. An excellent field for the American car are the haciendas, the proprietors of which often have to travel long distances. These proprietors are wealthy as a class and attractive literature printed in Spanish sent to them might result in many direct sales.

In Central America there are very few good highways and consequently comparatively few automobiles, most of these being of doubtful value. Local agents cover the countries and there is small opportunity for sales.

In the West Indies, except Cuba and the Dominican Republic, practically the same conditions are found as in Central America. The annual sale of automobiles in Cuba amounts to a little over 100 cars, about the same number being sold in the Dominican Republic.

Argentina leads the countries of South America as a market for automobiles, imports of cars into that country reaching 2,461 in 1911, most of these coming from France, while the United States sent comparatively few. There is much wealth in Buenos Aires and the country at large and American manufacturers are just beginning to cultivate the market. Compared with the methods used in the United States, the selling of automobiles in Argentina is not vigorously pushed.

Brazil offers an excellent market for American automobiles, there being 6,000 to 8,000 people in the Federal District alone who can afford to own motor cars. There is a large demand for high-grade machines, the purchasers desiring hill-climbing ability regardless of price, while cheap or low-grade cars find a poor market. Rio de Janeiro is the central selling point.

One-half of the 150 people in British Guiana who might afford an automobile are physicians or government officials. At present, pleasure automobiles in that country number thirty-seven and the average annual sale is not over fifteen cars.

Ecuador has twenty-two motor cars, eleven of which are of one American make. There are less than 300 miles of roads in the country suitable for automobile use.

The wild, rugged conditions to be found in Paraguay render the building of automobile roads out of the question for years to come and there has been no attempt to introduce motor cars into that country.

Road conditions also hamper the market for automobiles in Peru. Nevertheless, the sale of cars is increasing, although slowly. American cars are displacing the French in popularity.

Demand for Our Cars in Uruguay

The prejudice against American cars in Uruguay, so strong 3 years ago that sales were practically impossible, has been destroyed to such an extent that for 2 years the dealers have found it difficult to supply enough cars. At present, there is one automobile to every 2,000 inhabitants of Uruguay. Sales are being made at the rate of 100 cars a year, the fairly high-grade cars being most in demand.

The absence of suitable roads in Venezuela and the high cost of gasoline (65 cents a gallon) interfere with the wide use of automobiles, but there is room for more American agencies in Caracas. In opening an agency, however, it should be borne in mind that it is difficult to find active natives who could properly demonstrate a machine.

Austria-Hungary has excellent conditions for automobiling but is amply supplied as far as large high-priced cars go. However, inexpensive American cars of graceful appearance and ample power would find an excellent market in that country.

France offers only a fair market to the American manufacturer, largely on account of the preference for European cars, especially those of French make. Those American cars gaining a footing in France are mostly of the small, inexpensive variety.

The sale of American automobiles in Germany has been greatly restricted in the past, only about 100 machines having been sent there in the last year from the United States. The German purchaser prefers German machines as a rule, and, if this is not the case, hesitates to purchase an American car because of the lack of adequately-stocked repair shops with all spare parts and because the finish of the body is not often to his liking.

Owing to the large number of high-grade cars manufactured in Italy, American builders of this type of vehicle have not had much opportunity of invading that country. Makers of

small, inexpensive runabouts and touring cars are finding Italy a very fair market, however, while there is a limited field for motor trucks.

While the United Kingdom is an extensive manufacturer of automobiles, and is near France, Germany and Italy, where the production is also large, that country is the second-best customer of the United States in the automobile trade, being surpassed only by Canada. The prevailing opinion in regard to American cars in the United Kingdom seems to be that they are becoming increasingly popular because of their low price, although the public is not inclined to think them as durable as the English makes. The United Kingdom is fairly well covered as a market, but there is a good opening for light cars under 16 horsepower, as they enjoy lower tax rate. In Scotland, the low-hung cars have the preference on account of the narrow Highland roads with their sharp turns, while in Ireland low-priced cars are popular.

Russia has not many cars because of the poor road conditions throughout the country, but there is a demand for light cars for business use about the cities, while moderate-priced, light-weight American cars should find a ready sale in many districts.

As in other European countries, the chief outlook for the sale of American automobiles in Spain is for the low-priced cars, of light but durable construction. The only way to market cars in Spain with any degree of success is to send the cars there and demonstrate them to prospective purchasers. So far, little energy has been shown in the sale of automobiles in Spain.

Afraid That Our Cars Lack Strength

In the Netherlands and Belgium, American makers would have to meet and overcome a feeling that their cars are not strong and durable enough before they could expect to make much headway. Actual demonstration is the best method of marketing.

Switzerland does not offer a promising market for American cars because of the prejudice against them based on the argument that they are not suitable for Swiss roads.

Competition is keen in Sweden and American cars are coming more and more into vogue.

American manufacturers have not demonstrated their cars in Norway as energetically as their European competitors. Otherwise, many American cars could quickly be sold in that country.

Denmark offers an excellent opportunity for the sale of delivery cars and motor trucks.

The future of the automobile trade in Turkey is very promising. The same is the case in Roumania, but Greece and Servia offer comparatively poor markets.

In China there is practically no market as the roads are bad and the natives care little for automobiles.

The market in the Dutch East Indies is well worked and offers comparatively little opportunity.

India's imports of American automobiles are rapidly increasing and that country offers a fair market which might possibly be developed to a considerable extent.

Easily Obtained Parts a Necessity

Japan offers a fairly good market for small cars, although the road and climatic conditions tend to restrict the number of automobiles in use.

Siam and Siberia offer fairly good markets, which, however, have not been worked to any great extent.

Algeria may offer a permanent market for certain classes of American automobiles, their introduction having been a pronounced success. Egypt presents practically no opportunities.

South Africa offers an excellent market, particularly for the low-priced and medium-priced car. American manufacturers have not developed this market and kept in touch with it as they should have done. At present, the manufacturers will have to overcome the prevailing prejudice against American cars based on the claim of lack of durability.

Imports of American machines in Australia have shown a phenomenal increase in the past few years, but the market, although vigorously worked, may be further developed, all prejudices against American cars having been overcome. Practically the same conditions are found in Tasmania.

From nearly all the reports it would seem that the main essential for the development of a foreign market is the establishment of a branch or agency well supplied with spare parts and with facilities for making all sorts of repairs. Many of the consuls state that the people in their territory are not satisfied with the body finish of American cars, while others complain of faulty packing.

EXPORTS OF AUTOMOBILES AND PARTS FROM THE UNITED STATES IN 1909, 1910 AND 1911 AS GIVEN IN THE BOOK JUST ISSUED BY THE DEPARTMENT OF COMMERCE AND LABOR

Exported to—	AUTOMOBILES						PARTS		
	1909		1910		1911		1909 Value	1910 Value	1911 Value
	No.	Value	No.	Value	No.	Value			
Argentina	109	$81,614	268	$174,677	343	$420,193	$8,244	$22,150	$19,522
Australia	127	81,426	437	268,274	1,046	874,112	14,227	21,533	53,940
Austria-Hungary	22	36,978	25	26,178	36	27,911			
Belgium	14	46,340	58	147,375	133	241,269			
Brazil	24	26,892	64	67,687	181	225,083	8,527	7,802	15,769
British India	7	5,320	26	22,372	150	130,421	4,623	6,387	11,741
British South Africa	26	22,152	75	61,185	135	126,734	4,088	14,655	15,486
British West Indies	42	77,164	102	157,459	91	117,124			
Canada	1,230	1,457,129	3,102	3,340,326	4,687	5,047,927	230,509	1,023,386	1,726,842
Chili	2	1,471	3	1,824	16	15,231			
China	4	3,369	8	13,785	42	40,261			
Colombia	1	1,976	12	22,482	14	13,579			
Cuba	74	140,160	120	187,392	157	208,960	27,385	49,088	31,323
France	201	643,692	246	771,869	310	473,122	17,833	54,035	58,999
French Africa	4	7,611	11	18,188	21	4,214			
Germany	45	136,966	100	265,218	99	209,663	4,090	10,023	41,966
Italy	62	240,516	93	333,193	139	188,145	1,144	4,421	26,626
Japan	6	4,996	12	26,759	61	58,933			
Mexico	200	282,462	245	459,077	350	614,160	104,984	81,248	35,506
Dutch East Indies	53	40,836	33	21,768	42	34,252			
New Zealand	60	41,826	77	55,236	413	383,449	1,392	5,150	16,306
Philippine Islands	24	27,410	130	175,626	309	382,551	7,859	17,154	62,581
Russia in Europe	71	78,409	97	107,310	147	139,487			
Straits Settlements	14	12,040	21	20,955	36	28,951			
United Kingdom	593	1,680,154	1,271	2,415,593	2,249	2,273,222	131,937	240,621	322,457
Uruguay	4	5,657	20	23,666	96	147,142			
Other countries	165	202,455	270	363,226	500	525,953	38,337	83,867	105,106
Totals	3,184	$5,387,021	6,926	$9,548,700	1,1803	$12,965,049	$605,179	$1,641,520	$2,544,180

Selling Cars in Australia

The Antipodean Demands Good Treatment From the Agent and Insists on Plenty of Repair Parts

Small and Medium-Price Automobiles, Costing Up to $1600, Will Find a Market in the Island Continent

SYDNEY, AUSTRALIA, Aug. 5—There is a good field in Australia for the American motor car exporter to do a profitable business, but it must be done on lines different from those previously adopted. In the past the American exporter who wanted an agent for his cars generally sought the leading agent in each state, or, to put it in other words, the agent who has been doing the greatest business in cars of other countries, and these were in every case the leading cars of Europe. The evil results of this method has been in most cases to make the American line a secondary consideration. The agent who has been making a pet line of some European car has taken up an American car agency simply to fill the bill for a cheap car, and is in the habit of telling his customers that the American car is all right for light work, but advises the customers (if he can afford it) to go in for the higher grade European car for any solid work he desires to put the car. The result of this has been the education of the public to the belief that American cars are inferior in quality to those of other countries, and it has also been the means of many deserving cars having but a small market. Therefore the American exporter who proposes to do good business in Australia must secure an agent who will push his car in preference to any other.

Another mistake many exporters make is that they place their cars in the hands of agents who already have five or six different agencies, and although the agent is doing a good business for himself the return for the different makers is but small, taking it individually.

The high-grade and high-priced American cars have no sale at all, and in this respect their makers have themselves to blame, for they have allowed the makers of cheap cars to come here first and advertise their product as America's best, and as the public seems to get most of its motor education from advertisements, they have placed American cars as second grade. This superstition is going to be hard to remove. If the high-grade maker wants a market here, he will have to get an agent who will educate the people to believe that a good American car is as good in quality as any European car, and, with its high clearance and other rough-country features, is a most suitable car for our use.

Durability, Not Speed, the Requisite

In this country, the advertising of some speed record offers very little inducement for buyers to purchase, but records for durability, quality and the stocking of spare parts, do tempt people to buy.

As for public taste in this country, it must be said we follow the English style, especially as this is a British country. Numbers of motor buyers write home to England to their friends for the latest ideas, and apart from recommending English cars, English ideas are also driven into the minds of the buyer. The leading idea of all, seems to be the detachable wire wheel, which has a strong demand. The first high grade American maker who fits a detachable wheel will get a good market here among the better class of motorists.

Practical self-starters fitted to cars will also help to sell. The body work of good cars needs be of the latest design, and must be well finished, preferably of the style used in England. It might be mentioned there is a duty of $120 on touring bodies, which is sufficient protection to enable local body builders to make our "up-to-date style" of bodies here at about what it costs to import, and in this respect the European maker scores a point by exporting chassis only.

As there are no frosts in this country to speak of, air cooling has few points of advantage over water cooling, and in the matter of the latter type the thermo-syphon system is gaining favor.

In high-class cars finish counts a lot; that is to say, the finish of the chassis. Rough castings and the "gas pipe" appearance, as it is termed here, does not appeal to the public and cars with a rough finished chassis will never defeat the European car among the wealthier class.

Getting down to specifications: High clearance, well-sprung cars, and good hill climbers are the order of the day, and as fuel is costly, economical carbureters count a lot.

There is an immense field for light delivery wagons here, something to carry from about 1,000 pounds to a ton, which is lightly built yet strong, light on tires, fuel, etc. The retail firms are slow to take on light deliveries as they have not seen the kind to suit their requirements.

Large Cars Not Very Popular

Returning to the matter of agents, much depends as to how the agent is going to treat his customer after he has purchased, and upon the sort of repair shop he keeps. Another thing the maker wants to make sure of, and that is whether the agent will last in time of depression. We are at the present time enjoying prosperity, owing to good rainfalls; but if drought came, it is a matter of the survival of the fittest, for we all really depend upon the wool clip and the wheat yield for our prosperity. This year we have had a 2 months' stretch of no rain, and this means that the banks are slow to advance money; fortunately, however, the prospects of a drought have entirely disappeared, and city business is flourishing once more. The American maker who desires a good business here must secure an agent who can stand a drought, or even a bad season, for past history has shown that when an agency changes hands the line seems to fade away.

Getting down to the popular sizes of cars which will be in demand for the future, I will say that the big car of 40 horsepower and over will have a very limited sale. There are no millionaires in this country, and wealthy people are somewhat scarce, and of these, very few will entertain extravagant motor cars. The question of upkeep of large cars is most important in this country; for instance fuel is so scarce that gasolene is never used; naphtha and benzine are substituted and these cost in the cities 34 cents a gallon.

Tires are also expensive; most tires are imported and in addition to the usual freight, landing, and commission charges, there is a duty of 25 per cent., all which make tires about 50 per cent. dearer than in countries of their origin, so it can be understood that the expense of upkeep of large cars will render their sale very limited.

Touring cars up to 30 horsepower will do well in either four or six cylinders, and if good workmanship and finish are put into the car the price will not stop the sale, especially when the prejudice against American cars is removed. At the present time no American cars costing over $1,600 are being sold in the Commonwealth, but several costlier cars are now being imported privately, and people are beginning to realize that good cars are made in America. The cheaper class of American car sells well, however, as few, if any, European car makers can compete with the American small car builder.

The maker looking for a market for his car here will find Sydney full of American cars, but the other five big cities have not taken seriously to American machines as yet. The field there is well open, and only requires proper working for a successful trade. The exporter must remember we only have a population of four and one-half millions in the whole of Australia, including Tasmania.

Digest of the Leading Foreign Journals

Experiments with Various Types of Motor-Propelled Agricultural Tools Has Developed the Fact That Heavy Machines Do Not Pay—Lighter, More Elastic Implements Are Needed—Uniform Lubrication of Motor Cylinders

EVENTUAL Motor Tools for the Farm.—Experiments with agricultural motor machinery have served to convince Europe of the immense difficulties which are to be overcome in this field. It has been practically decided that the large, heavy and costly steam or motor plows never will return an interest on the investment which they represent—at least not where land values are high—unless used mainly for such work as subsoil plowing, ditching and the planing of meadows or rough-surfaced fields; work which may be carried on without close reference to seasons and weather and which does not require to be repeated year after year; in other words, work which would sort under civil engineering rather than under routine agriculture. The standard agricultural motor tool must be of an entirely different nature. The agricultural milling machine has been tried in many forms. It was based on the idea of the industrial milling machine for wood and metal working operations, which is that of working with cutting edges rotated at high velocity and intended to cut loose only a very small portion of the material at each cut. Difficulties in applying this principle to the milling of the soil arose everywhere. At the shop, the milling machine is stationary and its work is taken to it; in the field the machine must move, it must follow the undulations of the soil. The surface to be worked is immense and must be attacked by a tool of large dimensions. Whether this tool is long and turns rapidly or short and turns more slowly, its weight must always be considerable, so long as it is rigid, necessitating a powerful motor to work it, a heavy vehicle for carrying it. Such was the construction of the steam disk plows and similar machines and, though some weight reduction has been effected by substituting gasoline motors, such are still the characteristics of the more recent soil millers with rigid blades, as the Koszegi, the Quellenec and other ones. An apparatus of this kind cannot be light. If the rotary mass on which the blades are carried around at a speed of 150 to 200 revolutions per minute is suddenly stopped in its course by an obstacle there is produced a violent mechanical shock, an enormous accumulation of energy at the point of contact, a shock which reacts from the traveling blades attacking the control shaft, the pinions, chains, gears, the flywheel, the motor and the chassis.

Since, in fact, in this class of machines, rigidity has been found to be the fundamental vice which engenders all the subsequent defects from which these machines have suffered—great weight, high price, unsuitability for many forms of work—it was eminently logical to seek to replace the rigid soil-stirring tools with elastic ones, as has now been done. By taking this step the lack of homogeneity in soils was for the first time taken into consideration. The logic which has brought us to look upon the paws of fossorial animals as the best possible prototype for the tool sought to be incorporated in the mechanism of agricultural machines also finds itself confirmed in these considerations. It seems that the final solution must lie in this direction.—*Bulletin de la Société d'Encouragement pour l'Industrie Nationale,* March.

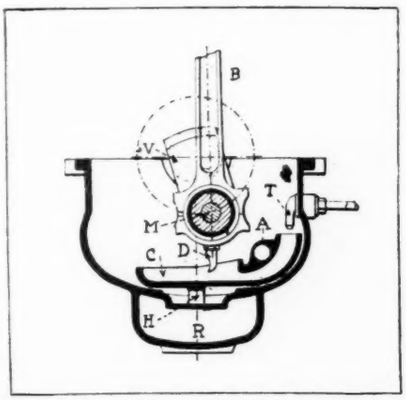


Fig. 1—Diagram of Minerva-Knight oiling system

Compound Regulation of Cylinder Oiling.—The amount of lubricant splashed upon pistons, sleeve and cylinder walls in the Minerva-Knight motor—is not only regulated by the speed of the motor, but is also co-ordinated with the amount of gasoline taken from the carbureter, the aim being to make it approximately proportionate to the heat and power development of the motor. The construction serving this purpose is indicated in Fig. 1, which represents a vertical section in the central transverse plane of one of the four cylinders, through the lower half of the crankcase. B is the connecting-rod, V the crankshaft, M the crankpin, D a scoop secured to the connection-rod knuckle and G an oilboat which can be tipped more or less by means of the shaft A to which it is secured, thereby making the scoop D dip more or less deeply into its contents. The shaft A runs the length of the crankcase, at one side of it, as shown, and at its rear end, which projects to the outside of the case, a crank is attached which is moved whenever the gas admission is regulated by means of the accelerator pedal. A lug H under the middle of the oilboat limits its downward movement and thereby establishes a minimum or oil datum, below which the regulation depends upon the motor speed alone. The short end of the oilboat is formed as a cup and into this oil supply for the boat is received from the tube T, which is connected with the oil pump. The latter is located at the middle portion of one side of the casing where the aluminum casting is bulged especially to afford a housing for it. It is driven from the sleeve-actuating shaft of the motor and draws from the oil well R which constitutes the lowest portion of the crankcasing in the manner of construction now customary. Besides driving the oil to the four oilboats the pump drives a small stream to a sight glass device on the dashboard, making a little red indicator dance to show that the mechanism is working. The oil in the well may for that matter be kept so high as to submerge the oilboats, and, by this provision, if the oil pump for any reason gets out of order the means are handy for converting the oiling system into one of ordinary splash feed.—From *La Vie Automobile,* August 3.

IT IS CLAIMED by the *Revue de L'Automobile* that paper can be made incombustible by means of an immersion in a very strong solution of alum and that the result is still better if the immersion is repeated after the first coating is dry.

System in Retail Sales of Gasoline

How the Garageman Can Keep Track of Every Transaction—Carelessness of Employees Checked

Scheme is Compact, Simple and Effective—Lubricating Oil, Grease and Graphite Included

GASOLINE sales by a garage may mean profit or loss to the establishment, depending on whether the large quantities of this fuel are handled with little or great waste. To determine the degree of loss and to reduce it to a minimum, it is necessary for a garageman to keep a close eye on his gasoline sales. There are three courses open to a garageman in the way of handling gasoline and lubricants; he can keep a rough memorandum of every sale of fuel or oil, he can obtain and file a receipt from the chauffeur for every purchase of these materials or he can have these records prepared in duplicate and send one to the owner of the car for which these materials were bought. Furthermore, the garage operator may either record the receipt of gasoline every day and total the amounts at the end of the month and deduct therefrom the total of sales; or he may do this work from day to day, and, as it proceeds, see where he stands at any time. The greater the amount of business done by a garage, the more obvious is the necessity of an elaborate system to keep record of its development. Carelessness, which in a small garage may incur a loss of $10 or $20, will result in a debit ten times as high in a proportionately larger establishment, unless an efficient system is installed to prevent such abuses.

The essential features of gasoline-recording systems used by a number of large and medium-sized garages in New York City are considered in connection with the accompanying illustrations. The capacities of these garages range from thirty to 300 automobiles, and the most perfect systems are used by the largest establishments.

Gasoline received by the garage from the oil companies is, in all cases, entered in a book. At the end of each month these entries are totaled and the sum of gasoline sales are deducted from the amount thus found. The same process is used in the making of the monthly inventory for oils and other lubricants.

New York, July..... 1 12.

Day	8 A.M.	Rec'd Gals	Hour	8 P.M.
1	159 gals.			90
2	62 "	300	10 A.M.	304
3	253 "			169
4	94 "	250	11 A.M.	286
5	261 "			112

Form 1—Monthly continual gasoline inventory sheet

The forms used in connection with gasoline and oil sales vary greatly as regards the details of their design. Some are ordinary receipt blanks with nothing but the name of the company printed on them; others have spaces specially marked for gasoline, motor oil, transmission grease, and some also for such material as waste. Some of the forms are made out single, others in duplicate, and in the latter case one copy of the gasoline receipt is sent to the owner of the car or reserved for him if he should demand it in the future. All forms either remain in their original books or binders, in numerical order, until the end of the month, or they are filed under the names of the customers whose purchases they record.

Cash Register Type of Recording

One of the simplest forms used in the sale of gasoline and oil is form 2. It is an ordinary type of blank suited for a continuous-band recording machine of the National cash register type, in which the operator writes out the name of the buyer, the date of the sale and the material sold, also the price. The form is signed by the owner or chauffeur, depending on who receives the gasoline or oil, and also by the man who delivers it to the buyer. The form here illustrated is given to the latter, while the garage retains a carbon copy of the hand-written information on a plain, white band of paper which runs under the printed strip of forms. This form is satisfactory for the opera-

B—89 The National Cash Register Co., Dayton, Ohio 23

NEW YORK MOTOR CAR COMPANY
231-233 WEST 40TH STREET

18887
Copy Number Here

New York, 191

Mr.
Address
Shipped to
At
Via

Amount on the back of the check is the same as on the face

9717 B
LINCOLN SQUARE GARAGE
Broadway, 64th and 65th Streets
NEW YORK
Gasoline and Oil Requisition
Date 19

Mr.
Address

Gasoline Gallons
Cylinder Oil Quarts
Gear Oil Quarts
Kerosene Quarts

Received by

11 10 9 8 7 6 5 GASO.

The Winton Motor Car. Co.
EASTERN DEPARTMENT
Date
Name
Car No.
NUMBER 7751 By

10 5 0 3 2 1 ½ ½ ¼ OIL

Form 2—Simple form of gasoline receipt in duplicate. Form 3—Gasoline slip with most important materials. Form 4—Gasoline and oil duplicate sales card

JOSCELYN STABLE COMPANY
AUTOMOBILE GARAGE
112-126 WEST 52nd STREET NEW YORK

RECEIPT

No 576

_____ 19___

OWNER _____

_____ Gasolene
_____ Light Oil
_____ Medium Oil
_____ Heavy Oil
_____ Gear Case
_____ Grease
_____ Waste
_____ Cheese Cloth
_____ Kerosene

_____ Chauffeur

No. 2347

Gotham Garage Company
102-104 West 46th St., New York
Lic. No. | Date

Name _____
Car _____
Storage _____
Wash, Polish _____
Gasoline _____
Oil _____
Grease _____
Waste _____
Sundries _____

Gotham Garage Company
102-104 West 46th St., New York

DELIVERED TO _____

SALESMAN _____ DATE _____

GLS. GASOLINE _____
" OIL _____
" KEROSENE _____
CANS GREASE _____
SUNDRIES: _____

Form 5—Gasoline and lubricants blank of large garage. Form 6—Gasoline-and-oil card for out-of-town cars. Form 7—Blank used by the same company for its regular customers

tion of an establishment doing not too large a business in fuel and oil, as every detail of the sale has to be recorded by hand.

An advance over this type of blank is form 3, which contains the date, name of buyer and figures referring to gallons of gasoline or quarts of oil. This reduces the work of the person recording the sales to a considerable extent. The forms are numbered consecutively and come in pads, a tan-colored duplicate following every white original. This form is also signed by the person selling and the one receiving the goods.

Form 8 is designed for the recording of gasoline only and is a correspondingly simple blank. The blanks are numbered consecutively and come in duplicate in book form. The original of the slip is given to the buyer, while the carbon copy remains in the original book as a basis for the monthly compilation of the bills. Exactly the same design except for the substitution of the words oil (grease)—either of which is struck out when the slip is filled—is used in the handling of lubricants.

Special Blanks of Varying Details

The next simplest type is probably that shown as Form 7. It enumerates the most important materials, in the same way as the preceding forms, but also contains a space for whatever sundries the garageman sells to his customer. These forms come in duplicate. The original is white and is given to the buyer, while the yellow copy remains in the book. These forms are not numbered.

Another type of blank which specifies with greater detail the various classes of lubricants handled by the garage is form 5, which is made out singly. The copy here shown is printed on pink paper and bears a number, the forms being issued in series of consecutive numbers. As in the case of other forms, the chauffeur or owner receiving gasoline or oil signs for it.

A special type of blank is form 6, which contains spaces for gasoline and oil in addition to storage, etc. The company using it does considerable business in storing and serving the cars of the guests of several elegant hotels; it is the same company as the one issuing form 7. These machines are left in the garage for several days, sometimes for but a day, and therefore they do not appear on the regular customers' book, but when a car is brought to the garage, form 6 is filled out with the date, name of owner, make and license number of car and orders as to what is to be done with it. This form is filled out without a duplicate, as, if the latter were lost and the car claimed by someone willing to pay the storage and other dues on the car would have to be delivered to that claimant. All the charges appearing on the card, form 5, are billed to the customer when the car is delivered to him.

One of the most practical forms in use is form 4. It consists of a soft pasteboard perforated along its middle line and printed the same way on each half. The figures printed for the marking of gasoline and oil are arranged symmetrically with reference to the perforated line, so that, by bending the card along that line and punching a certain number, this is simultaneously punched out of both cards. Three sides of each half card are printed with figures referring to gasoline and the fourth side is reserved for oil. The latter figures are printed red to contrast with the black print of the gasoline-recording figures.

Aside from these small sales blanks, larger forms are used, which serve for bookkeeping and billing purposes. One of these designs is shown as form 8, which is used by a company recording gasoline and oil by a plain blank similar to form 2. Form 8 is a monthly sheet on which all materials bought by a customer are enumerated. The quantities of gasoline, other lubricants, supplies and sundries are entered on this sheet, which is 17 by 14

MR. _____ ACCOUNT NO. _____

_____ SHEET NO. _____

To THE MITCHELL-EDMONSTON GARAGE, INC. Dr.

23 WEST 62ND STREET,

TERMS NET CASH. NEW YORK, _____ 191 TELEPHONE 9086 COLUMBUS

GASOLINE	OIL AND GREESE	STORAGE	SUPPLIES	SUNDRIES	TOTAL	PAYMENTS

Form 8—Monthly gasoline, oil and supply sheet made out in duplicate for each patron

WYCKOFF, CHURCH & PARTRIDGE, Inc.
Gasoline Slip

OWNERS OR CHAUFFEUR'S RECEIPT

Date	Charge to	Order No. Gas 17600

Received.....gallons gasoline

Delivered in.....Car

Signed.....

Form 9—Simple type of gasoline slip made out in duplicate

inches, together with their prices, so that the original sheet serves as a bill to the customer, while the duplicate is retained by the garageman.

The monthly, itemized statement, form 10, is somewhat similar to the preceding blank, but differs from it mainly by having the dates of the month printed on it for a daily recording of gasoline, oil and grease sold to the customer to whose purchases the page is devoted. In addition to these records, the form affords spaces for other supplies, the date of their sale, charges and credits to the customer, and his eventual balance at the end of the month. This form is also made out in duplicate, the carbon copy remaining in the original book, while the copy here shown is detached by tearing a perforation. This sheet is continued day by day, so that at the last day of the month it remains but to enter one day, post the items and send the bill to the customer.

Form 11 is a very ingenious type of blank which is used by the same company as form 5. Form 11 is a tan-colored envelope, 5 by 7 1-4 inches, in which all small gasoline, oil, supply and other memoranda are kept until the end of the month. Then they are added and the totals of the various classes of items entered in the proper places on the front of the envelope, from which they are copied on the monthly bill sent to the customer. After the bills have been sent out, all envelopes of 1 month are filed away alphabetically by the names of car owners and held on file for future reference during the next half year.

Standing Inventory of Gasoline

The company using term 6 has devised another blank proving a standing inventory of the gasoline stock. This is necessary, because the garage using this form does a very considerable business in gasoline and, therefore, has to keep very close tab on the quantities received and sold. The form serving for the gasoline inventory, form 1, is 8 by 10 inches, printed on white paper and designed with one line of space for every day of the month. The gasoline stock of the company is measured at 8 a. m. and at 8 p. m., and additions to the stock are entered between these times, giving the exact time of receipt and the quantity of fuel taken in. The differences in stock must be accounted for by sales slips, form 6, or stock requisitions, when gasoline is used by any of the employees for inside work in the garage.

Thus, by the use of a gasoline-and-oil sales form, a customer's monthly record form and a continual inventory form, a garage, no matter how large, can easily keep record of every gallon of gasoline and oil, every can of grease and graphite. The sales forms are made out by the man tending to the gasoline pump, the monthly record and the inventory by an office worker. This makes the whole system compact, simple and effective in that it permits the garageman to see, at any time he chooses to find out, what state his gasoline business is in and where it is necessary to exert increased care in watching the employees. Furthermore, the preparation of a monthly profit-and-loss account for the garage is an easy matter when all the minor items are taken care of by the use of a subsidiary system devoted to the recording of gasoline and lubricant deals.

Harking Back a Decade

FROM *The Automobile and Motor Review*, August 23, 1902: Consul-General Bellew, at Yokohama, Japan, reports that so far thirteen automobiles have been imported into that country, but that most of them still remain in the hands of the importers, who use them for advertising purposes. Automobiles are not classified under the Japanese tariff and they are admitted as carriages, paying duty of 25 per cent. ad valorem.

The 1902 Toledo touring car has a motor with three cylinders ranged vertically with its cranks equally spaced on the shaft, giving three power impulses for every two revolutions.

The commonest and most natural mistake of the novice who tinkers with his vaporizer is to give the engine too much gasoline. Most modern vaporizers, particularly those of the float-feed type, are provided with a drip outlet in the mixing chamber making it impossible to flood the latter, but occasionally a vaporizer is found which, when fed with more gasoline than the air passing through can take up, will allow the liquid to accumulate.

J. W. Packard, president of the Ohio Automobile Company, has designed a 12-horsepower car for his own use. The car has hollow steel axles running on 7-8-inch balls. The wheelbase is 84 inches. Eight of the principal bearings are oiled automatically.

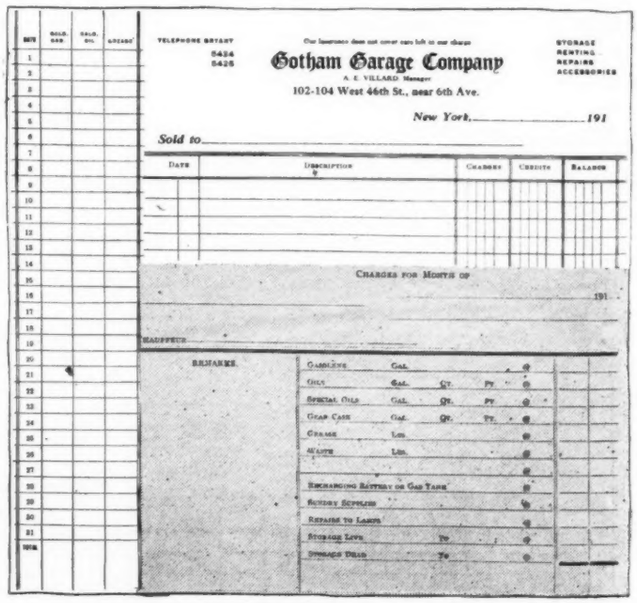
A. W. King, one of the pioneers in the manufacturing industry, has retired from the Automobile Company of America, and will shortly bring out a new type of motor vehicle.

The Pierce motorette entered in the recent endurance run of the Automobile Club of America, negotiated the 100 miles on 4 gallons of gasoline without making a penalized stop. Sixteen other contestants finished the run with clean scores.

The National Association of Automobile Manufacturers has adopted a standard guarantee to be used by all its members. The main feature of the guarantee is the clause providing for a 60-day limit to its effect.

Charles L. Fair, of San Francisco, and his wife were killed near Pacy-sur-Eure, France, when Mr. Fair's car skidded and ran into a tree. Mr. Fair was brother-in-law to W. K. Vanderbilt, Jr.

The automobile belonging to Major Eben Hill, of Brigadier-General Frost's staff, has proved very useful during the past week about the state military rendezvous of the Connecticut National Guard at Niantic. It proved so speedy that some of the staff officers failed to get into the saddle at all during the week of maneuvers.



Form 10—Monthly record and bill for gasoline, oil and materials used by each patron. Form 11—Envelope serving as basis for monthly compilation

Otho Electric Starter

Description of a Device Operated by the Automobile Motor Which Generates Current for Ignition, Lighting and Starting

AN ingenious starting and lighting system, which is unique in that it involves a motor with a stationary armature, field and commutator, has been brought out by the Otho Motor Company, of Boston, Mass. The only moving part of the motor generator is the flywheel of the automobile motor, a fact which stamps this starter as something distinctly new. The results accomplished by the starter are similar to those of other systems involving a motor generator and a storage battery. After starting the motor the device becomes a generator which stores up the current in an accumulator from where it is taken to light the lamps, furnish current for ignition purposes if desired and after the motor has been stopped to restart the motor. In the adaptation of the device, however, a marked degree of ingenuity has been used and a distinctly new method of construction evolved.

A comprehensive idea of the device is given in Fig. 1, which shows a part section through the installation. As may be seen, a special form of flywheel is required. The only moving parts of the device, the four brushes and pole pieces are carried on the flywheel. They are indicated in the illustrations, Figs. 2 and 3. The moving parts are firmly fixed on a solid foundation formed by the rear of the crankcase. This framework carries all the wiring so that there is not a moving wire in the whole arrangement. In addition to this it carries the commutator as seen in Fig. 4. The flywheel is formed in such a manner that it can be slipped over the stationary frame, allowing the pole pieces to take up their proper positions in relation to the stationary field and aramture.

Description of the Device

Armature winding consists of thirteen coils of No. 12 wire; laminations are placed between the coils and moulded in an insulating cement forming the stationary armature and field ring. There is one field winding consisting of 10 pounds of No. 12 wire. The battery outfit needed is six cells of Exide-lead storage batteries. These weigh about 10 pounds to the cell. Only Exide batteries can be used with this system. Using the full voltage of this storage battery, which will be slightly in excess of 6, the starter will operate at 35 amperes. The storage battery will start to be charged at about 200 revolutions per minute of the crankshaft, or at an approximate speed of 10 miles an hour. The motor-generator takes up the functions of a generator as soon as the motor starts to fire, but it does not start to charge the battery until the speed reaches that just designated. A centrifugal switch throws in the battery when this speed is reached and keeps it in until the speed mounts up to 35 miles an hour on the regular adjustment. Above 35 miles an hour the battery is cut out. The latter speed is adjustable, however.

The fact that the battery is disconnected from the motor-generator at lower speeds than 10 miles an hour will prevent the possibility of the batteries discharging through the motor when the car is standing idle should the switch be left in.

Simple wiring and a simple method of switching is used in the present form of the starter. To start the motor the gear-shift lever is moved over to a special notch; this throws in the switch and starts the motor-generator, which now performs the functions of a motor and starts the engine. The wiring is very simple also, as may be noted from a study of Fig. 4, which shows the two wires leading to the storage battery. A ground wire is the only additional wire necessary.

In fitting the starter to a motor any type of clutch may be used. The sectional view, Fig. 1, shows the device installed in a flywheel with a multiple disk clutch. The flywheel will be of a slightly greater diameter than is generally required in order that the extra fittings may be installed. The motor is sufficiently powerful to turn the engine at 75 revolutions a minute until the battery current is exhausted, although a long application of this power will never be necessary. There is no reduction gearing.

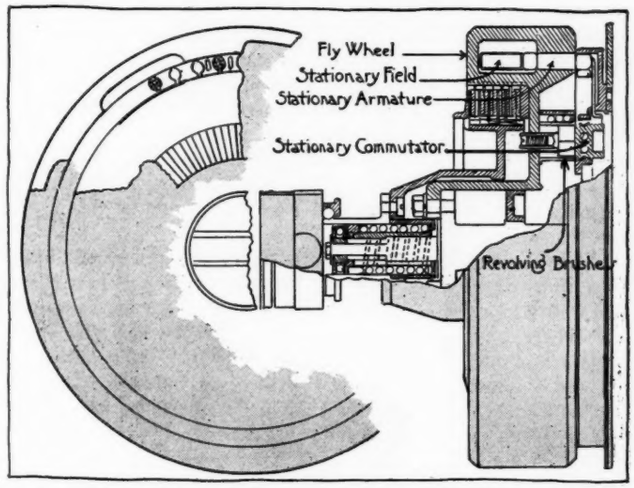
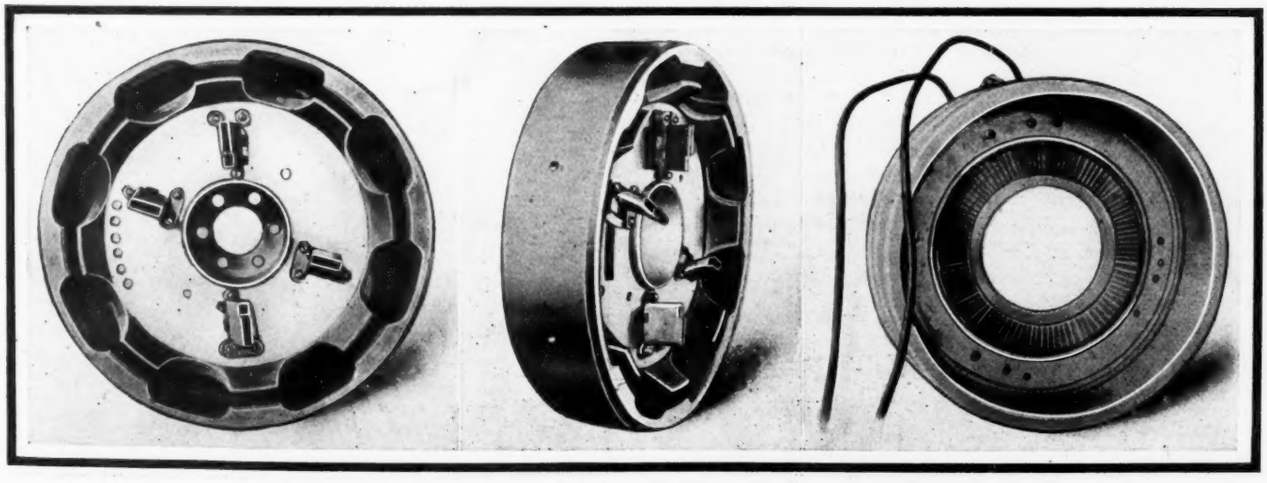


Fig. 1—Part section showing installation of Otho Electric starter



Figs. 2, 3 and 4—Showing the brushes, pole pieces and commutator disassembled

Properly Patching a Punctured Inner Tube—Information on Induction Coils—Schemes to Increase Power—How to Test for Leaks in Gas Tanks—Questions in Ball-Bearing Design—Job of Dentistry on Worn Brake Ratchet Teeth

Steps in Patching an Inner Tube

EDITOR THE AUTOMOBILE:—I have a 30-horsepower touring car and wish to know as to how to keep my tires in good condition. What I would like to know specifically is how many extra inner tubes I should have and what I should do to keep these so that they are always available. I would like to know the best method of applying patches to a tire, as I have tried it and always had the patch come off after a short time. There is evidently some step that I do not carry out in the application of the patch or I am sure that I would get better results than I am having now.

New York City. C. C. COPPER.

—In the first place, if you are doing any extensive touring, five inner tubes besides the four on the car would not be too many to carry. If you just use the car around the neighborhood, three will be sufficient. The main point to remember is to keep these tubes in good repair so that you will always have them to rely upon should you get a succession of punctures. The possibilities are that on a 50-mile trip three successive punctures may be sustained, while again a trip of 1,000 miles may be taken with none at all.

After the trip take the punctured tubes to the workbench and cure them of all leaks. It would be well for the car owner who does his own repairing of inner tubes to have a vulcanizing outfit. There are many small ones on the market which give entire satisfaction and which are very easily handled. If a vulcanizer is used, the method of procedure will be as follows: Carefully and thoroughly sandpaper the tube in the proximity to the leak, Fig. 1, removing all signs of dirt. When the tube is white and clean rub the surface of the rubber with a little gasoline. Cut the patch to the desired shape so that it will fit over the puncture and soften it by saturating it with gasoline. The patch will become gummy and can be kneaded in the fingers. The patch is then applied to the puncture and vulcanized. The method of application of the vulcanizer will depend upon the type used.

When a vulcanizer is not used the tube and the patch are prepared in the same manner as has been described. After the patch is ready to be applied to the tube put a thin coat of cement on the tube and another on the patch. Allow these to become thoroughly dry. Then apply another thin coat of cement to both the tube and the patch. When this is nearly dry apply the patch to the tube, being sure that the hole in the tube is as near the center of the patch as possible. The patch being placed upon the tube, it is necessary to exert considerable pressure to make a good, firm job. A clamp, such as shown in Fig. 3, can be applied to advantage.

Wants the S.A.E. Rating Formula

Editor THE AUTOMOBILE:—Will you kindly publish a formula for the S. A. E. rating?

Woodsfield, O. CLYDE TROUTMAN.

—This formula and its derivation were published in THE AUTOMOBILE of August 1, on page 231.

Induction Coil Information Wanted

Editor THE AUTOMOBILE:—What is the voltage delivered at the spark plugs using six cells dry battery and vibrator coil?

2. Does one make coil produce a hotter spark than another on the same number of cells? If so, give the make.

3. Are there any four-cylinder, four-cycle automatic intake valve motors made? What cars use them?

4. Will a set of six dry cells burn out a coil if left connected up? If so, how long will it take?

5. How will a motor act if it uses a burnt coil?

Lebo, Kan. J. H. DRESSLER.

—(1) This voltage is not exactly known. A current of 20,000 volts will jump a gap of 1 inch at atmospheric pressure. This is taken as a basis and estimates have been made using this as a criterion. The generally accepted opinion is that the potential of the current ranges between 8,000 and 10,000 volts, while the amperage of the current is negligible at the plugs.

(2) One coil will produce a hotter spark than another if it has more secondary windings, if it more carefully designed and if the secondary windings are laid closer to the primary. This is the case regardless of the make of coil. When you pay more for a coil you get a coil that has better quality insulation. When the highest grades of insulation are used on the secondary windings of the induction coil the effect is that the laminations of wire are closer to each other because the insulation is thinner. It must be understood that the efficiency of the induction coil

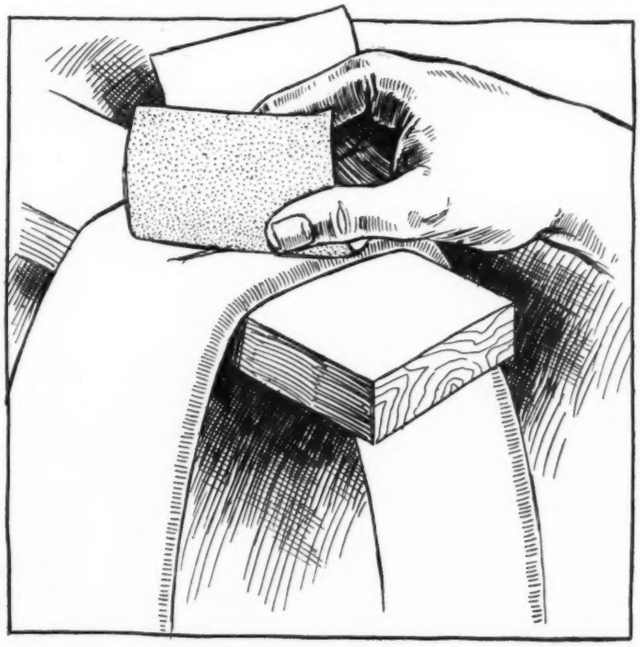


Fig. 1—Sandpapering tube—first step in vulcanizing

depends to a great extent on the number of secondary windings for a given size coil. The closer these are to the primary winding the better for the reason that the induction field is more intense the closer to the primary winding and therefore it may be stated as a fact that the thinner the insulation on the secondary wires the more efficient will be a given size coil so long as there is no leakage of current through the insulation.

(3) There are no more automatic intake valve motors made, all having been discarded in favor of the mechanically operated.

(4) As a general rule it may be stated that the batteries would be run down before the coil would be burned out.

Information on Racing Motor Gasoline

Editor THE AUTOMOBILE:—Will you kindly give the following information:

1. What is the best gravity of gasoline for racing, and would it be satisfactory for average running in the average car? Why?

2. Can you give me a formula for a compound which when applied to brakes will prevent them from squeaking, but will not interfere with their efficiency?

3. If an ordinary single-unit spark coil were inserted in the plus wire from the battery or magneto of a Ford car, as in Fig. 2, so that the current would flow through the primary winding only, and then four vibrators of the regular four-unit coil were

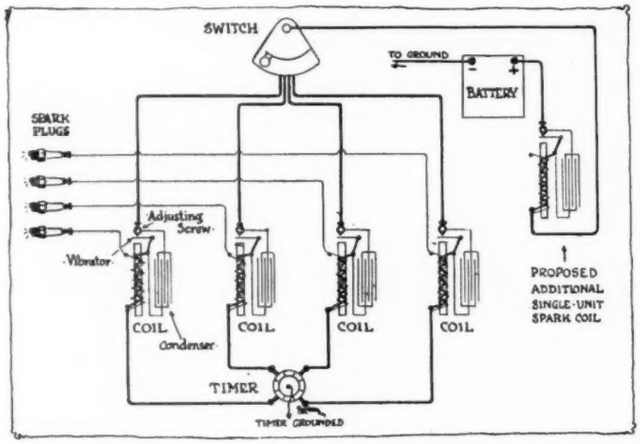


Fig. 2—Diagram showing single-unit coil inserted in positive wire from battery to magneto

short-circuited, would not the use of the single vibrator of the inserted single-unit coil give as good or better results than are obtained by the use of the four-unit coil and the four vibrators by giving perfect synchronism and by reducing the number of troublesome vibrators? If such were done, would it be better to short-circuit the secondary winding or not? Do you think the scheme would work with any satisfaction? If batteries alone were used, would this scheme consume more or less current than the original system?

4. If an extra plug were inserted over the exhaust valves of on Overland 1912 4 by 4 1-2 motor would there be any gain of power? Would the Splitdorf magneto employed on these engines generate sufficient voltage to operate the two plugs, when placed in series?

Oakland, Md. A. JOUCE RIKER.

—(1) The ordinary automobile naphtha or gasoline of a grade varying from .60 to .69 is used to the greatest extent in races. In former years racing drivers were under the impression that a high test fuel was the best, but soon found out that it did not have the power of the fuels of lower test, although it was easier to start the motor with these fuels. The demand for gasoline of a high test has now practically disappeared since the drivers have become educated to the point that the lower tests contained the greater number of heat units. Improvement in carbureters has also been responsible to a great extent for the use of the more

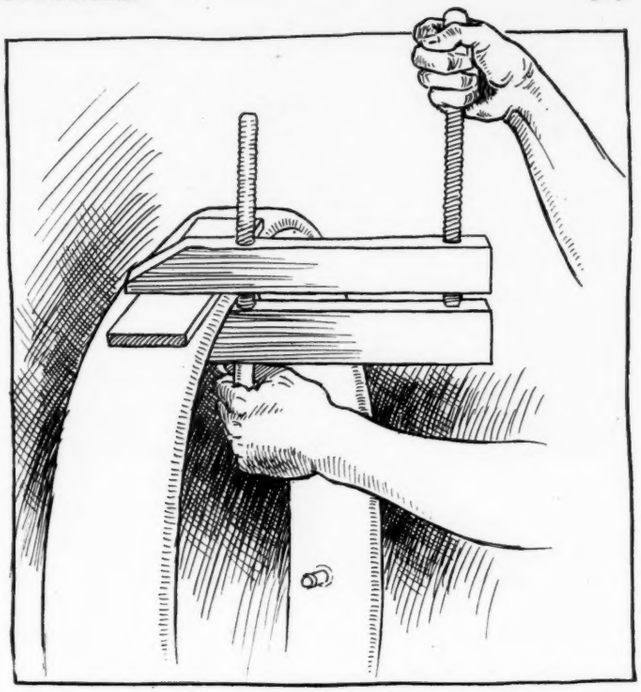


Fig. 3—Clamping patch on tube to insure adherence

powerful fuels, as the difficulties of starting are now not nearly as great as they were. Gasoline from one part of the country will have a different test than from another part, so that allowance will have to be made for this when stating the best quality for use in a racing car. In the Atlantic Coast States 66 gasoline is very good for racing. The best Ohio gasoline from Lima crude is from 58 to 60 test, and Texas and California crude produces a gasoline which is best at 56. In Maryland it may be said that the best is as stated, 66.

(2) The fault of a squeaky brake is in the fabric that is used as a lining. The best cure is to remove the fabric that you now have on the brakes and replace it with new material. The fault may be in the composition of the fabric or it may be that the fabric has been improperly placed on the shoe. It will occasionally happen that the fabric becomes torn and the wrinkle causes a squeak.

(3) In using a single vibrator from battery or magneto it will be necessary to short-circuit all four coil vibrators, using a common master vibrator in connection with the four-unit coils which would give a perfect synchronism, but you would be subject to the trouble that arises from running a master vibrator continuously in that the contact points burn out and cause defective spark timing. If you should short-circuit the secondary winding it would be impossible to get current at the plugs. As to current consumed, if the battery were used alone, there would be no more current consumed than with the original system providing the coils were kept properly adjusted.

(4) There would probably be a slight increase in power if you used a double set of spark-plugs and arranged them so that they would fire simultaneously, but this must be done with a double distributer magneto. There can be no good results expected from two plugs connected in series, as the second plug will introduce complications that make it very unsatisfactory in action. The result of such an arrangement would probably be a very weak spark in both plugs. The Splitdorf people state that this magneto would not and could not be expected to work well when connected to plugs in series.

Presto Tank Is Exhausted Rapidly

Editor THE AUTOMOBILE:—I do not seem to be able to get the service out of my Presto tanks that I did when I first got my car. I do not drive at night any more than I used to and yet

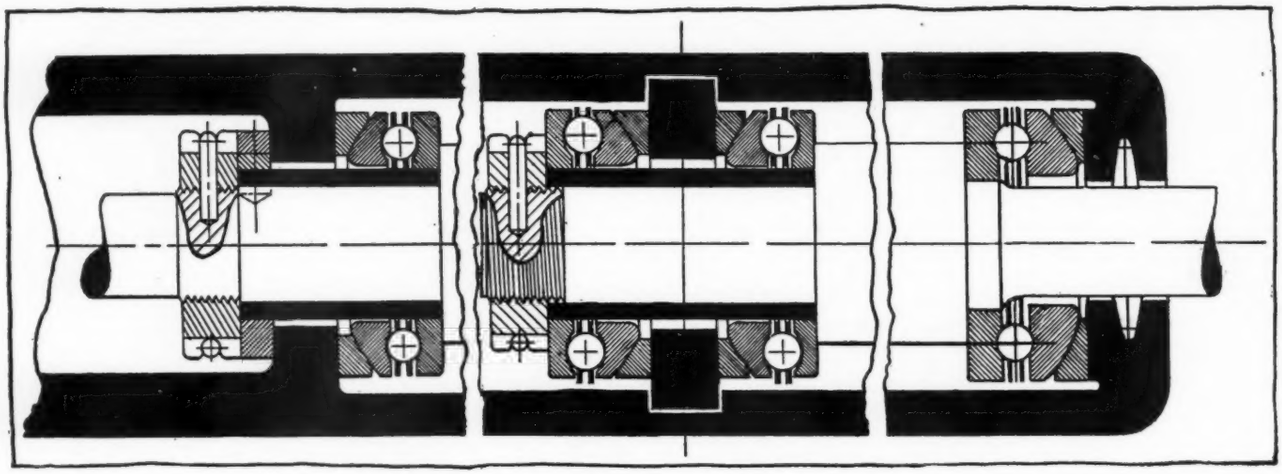


Fig. 3—Three types of ball bearings designed to take thrust in either or both directions

while I formerly got a whole season's use out of my tank I now find that the best I can do is a month. I am using tanks of the same capacity that I always did. It naturally must be due to a leak, but I do not know how to look for it. I have been advised to try by smelling, but I have sniffed along that pipe line as many as a dozen times without discovering anything that seemed as if it might be a leak. Will you please tell me what to do?

Bridgeport, Conn. C. D. WILLIAMS.

—THE AUTOMOBILE has just received a communication from Carl G. Fisher, president of the Prest-O-Lite Company. He gives the following information:

"Leaking pipe lines are a frequent but perfectly needless source of waste. The trouble lies almost always in the carelessness of the user. Complaints of short measure and excessive gas consumption are always traceable to leaks. The peculiar feature of this is that if the owner will spend but a few moments in testing the tubing from the tank to the lamp, the waste will be eliminated, and in many cases the life of each tank of gas will be doubled.

"First disconnect the rubber tubing at the lamps, and pinch or clamp the ends tightly. Go over every inch of the rubber and brass tubing and each connection with heavy soapsuds, seeing that every portion is thoroughly covered with it. Then turn on the gas. A leak at any place will be shown at once by the formation of a bubble. If it is formed at a connection, this should be tightened at once. If the bubble appears on any portion of the tubing (either rubber or brass) it is a sign that the tubing should be replaced or repaired. Rubber is a very treacherous substance and hardens and cracks very easily after exposure to air, heat and sunshine—yet some gas tank users are clinging to rubber tubing that they have used for a year or more.

"The places where the rubber is joined to the brass tubing should be watched carefully as they are a prolific source of leaks. Wherever the brass tubing is run through the frame or mud apron it should be protected from wear. Very often leaks are found at such spots. The rubber tubing, however, is the worst offender and a few cents spent in putting in new rubber connections will often pay for itself many times over in the gas saved. When all of the tubing and joints have been tested and connected to the lamps, the lamps themselves should be tried for leaks. Put soapsuds around the base of the tip and on the stem which holds the tip and on the rubber tube joints at the lamps. Then turn on the gas and light the lamps. If bubbles appear at the joint in the stem inside the lamp, this stem should be unscrewed and the threads covered with white lead.

"Every automobile owner should make this simple test, whether he suspects a loss of gas from leaks or not—and it should be done three or four times a year at least. Every Prest-O-Lite tank is charged to full capacity and fully tested at our charging plants, and wherever a user seems to be emptying his tanks too rapidly in nearly every case pipe-line leaks will be found responsible."

Route from Boston to Altoona

Editor THE AUTOMOBILE:—Will you kindly outline the shortest and most practicable automobile route from Boston, Mass., to Altoona, Pa., giving me distances, etc.?

Lawrence, Mass. J. RODNEY BALL.

—The best route to follow from Boston to Altoona, Pa., is by way of Boston, New Haven, New York City, Harrisburg and Altoona. Going from Boston direct to Providence, a distance of about 45 miles, to New Haven which is about 126 miles from Providence, and then on to New York City, 73 miles further, you will have the shortest route, covering about half the journey. From New York City, cross over to New Jersey by way of the Forty-second street ferry to Weehawken. By following route 41 of the Blue Book to Easton, you will find excellent roads. The distance is about 87 miles. From Easton you pass through Nazareth, Bethlehem, over the Lehigh river into Allentown, and thence into Reading, covering about 57 1-2 miles. Here you will turn west on Penn street with trolley across iron bridge under railroad and straight through village of Sinking Springs. From there on to Harrisburg, you pass through Myerstown, Lebanon, Palmyra, Hummelstown and then into Harrisburg, covering about 54 miles. From here to Altoona the roads are fair, covering about 138 miles. Starting out from Harrisburg, turn north on Second street past Soldier's Monument. Passing through Dauphin and thence on to Mifflintown, the roads are very rough, but from there on through Huntingdon, Alexandria, Birmingham, Tyrone, and into Altoona, they are excellent.

Advocates Left Steer, Center Control

Editor THE AUTOMOBILE:—Referring to your editorial in the August 1st AUTOMOBILE regarding the advantages and disadvantages of left-hand steer, the writer would call your attention to one point evidently overlooked:

You state that the driver sitting on the right side can gauge his relation to the ditch much more readily than one sitting on the left, but overlooked the fact that the driver on the left can watch an approaching vehicle much more readily.

The writer drove right-side steer cars for 5 or 6 years and this year is driving a high-powered car with left-side steer and center control. He finds the left-side steer far superior in all particulars, especially in being able to see how close the wheel of an approaching vehicle is to his own wheel when passing. Possibly in a country where the roads are lined with deep ditches, the necessity for watching the ditch might be greater than that of watching the passing vehicle, but in the writer's opinion the danger from careless and reckless drivers is much greater.

Were not the first American cars copies of foreign cars built with the right-side steer to accommodate the car to the foreign rules of the road where all vehicles pass on the left?

Do not most of the arguments favoring right-side steer come from those having had no experience with driving on the left side and from manufacturers whose policy it is to make no changes unless compelled to? Are not most of the largest manufacturers of high-priced cars today resting on their reputation and selling out-of-date machines to save the expense necessary to add these later improvements? Do not the purchasers of high-priced cars seldom do their own driving and for that reason remain careless as to features of construction of advantage to the driver? ABBOTT WIDDICOMB.

—If you will look on page 210 of THE AUTOMOBILE for August 1, 1912, you will find that the point you mention is cited there under advantages of left-hand steer and is illustrated at the top of the opposite page. As you say, this constitutes a great advantage in favor of the left steer.

Question of Ball Bearing Design

Editor THE AUTOMOBILE:—Are ball bearings that are used to take thrust in one direction only of substantially different design from those which take thrust in opposite directions? If so, please explain the different mountings.

Boston, Mass. E. D. FITZGERALD.

—There is a distinct difference in the ball bearings that are called upon to take loads in either direction and those which are only required to stand a stress from one side. The loads referred to are thrust loads and not radial loads. There are three distinct types of bearings which are distinguished by the different kinds of thrust load they are compelled to bear. The three types, as made by the Timken company, are shown in Fig. 3. The first of these shows a bearing which is designed for take thrust in one direction only. As may be seen from a study of this illustration, if the thrust should cease or should come in the opposite direction, the cage containing the bearings would be apt to drop slightly out of place and when the thrust was resumed the balls would become pinched between the plates. When there is a chance that there will be a cessation of the load so that the plates would separate, a nut, such as that shown in the second bearing, is necessary.

The second type of bearing is one in which a slight thrust in the opposite direction has to be sustained. A plain disk is inserted as shown for the purpose of taking up the load in this direction.

The third bearing is similar to the first in many respects. In fact, it is really two of the first type of bearings turned end for end so that the thrust in either direction is equally well taken care of. In giving these types of mountings the Timken company cautions the user not to allow an undue amount of thrust to be set up by an initial adjustment of the nut behind the one bearing. The setting-up process should not be carried to too great an extent, as a ball bearing is so designed that the friction is not perceptible to the touch except when the bearing is seriously overloaded. Aligning washers are also essential with the thrust bearings wherever the shaft axis can for any reason change position. As distortions may occur during service, the aligning washers are strongly recommended in all cases. Special stress is laid on the alignment of the shafts by all bearing manufacturers, who agree that while distortions may not occur during ordinary work there are very apt to be times when an extraordinary occasion will cause a serious disalignment unless there are special provisions made to brace the shaft. Of course, the extent of the injurious results consequent upon a disalignment of the shafts depends almost entirely on the degree of distortion of the plane of thrust.

Has Solution of Blow-Out Problem

Editor THE AUTOMOBILE:—Responsive to your request for other automobilists to explain Mr. Worseldine's tire trouble, I submit the following explanation:

Since a straight-side type of tire is generally held on a rim by the tension wires in the bead, it follows that after 1,000 miles or thereabout of use they slightly lose their tension. When this takes place it is evident that the casing either creeps a little or else tends to lap itself at some point on its periphery, depending on the elongation of the bead. The result is that it pinches the tubes and causes it to blow out immediately, or else while standing still, involving thereby the factor of the owner's luck. Having the flap in the tire makes little or no difference in my opinion.

I have had this trouble in a much more exaggerated form. A crooked dealer once sold me some clincher tires (soft-bead type) for use with quick detachable rims. While they were new they were all right, but after about 1,000 miles they would expand, often as much as 4 inches, and blow out the tube.

The remedy I suggest is Q. D. tires.

Chicago, Ill. L. O. SCHOPP.

Emergency Brake Lever Won't Hold

Editor THE AUTOMOBILE:—I wish to give a little experience I have just had happed to me, with the idea that it may help some of your other subscribers and prevent them having the same trouble that I had a little over a week ago. I left my car standing on a hill just above a railroad station on a prominent street in the upper part of New York City. I thought the car was perfectly safe where I left it, but it happened that the ratchet which held the emergency brake lever was worn nearly flat, and as a result the lever did not stay in place but slipped out, allowing the car to roll down the hill and out onto the track. Only the timely action of some workmen saved the car from being smashed to pieces by an oncoming train. I have since examined other cars to see if they were deficient in this respect and have found several that were. I made a couple of sketches showing the ratchet as it was on my car and another as it should be. These are reproduced in Figs. 4 and 5, and I would state that I believe it would pay the owner of a car to go over his machine with a file, touching up such points as these. On many of the smaller makes of cars these ratchets are not nearly as deep as they should be in the first place, so that it does not take long for them to wear away. In a short time they become so inefficient that they are likely to fail just as mine did.

New York City. J. T. TODD.

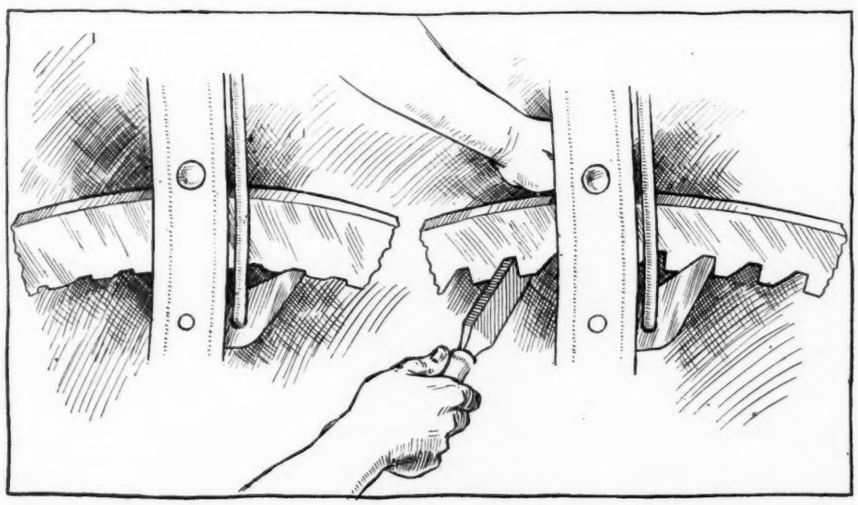
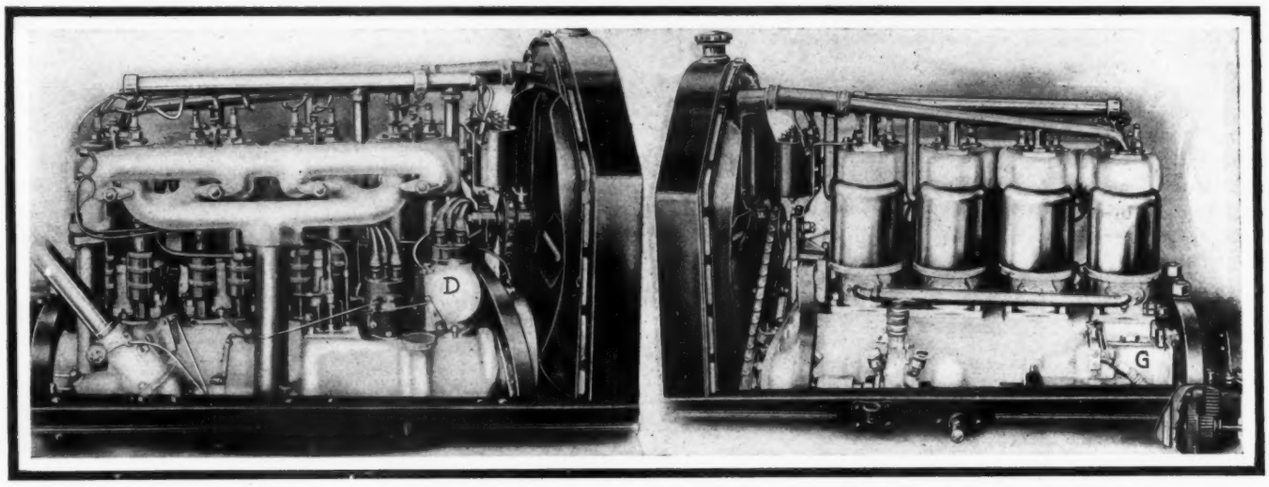


Fig. 4—Showing brake ratchet with worn teeth. Fig. 5—Filing up ratchet teeth to hold lever



Figs. 1 and 2—Side views of the 1913 Cadillac motor, showing copper water-jacketed cylinders and inclosed valve stems and springs

Cadillac for 1913

Increased Length of Stroke Most Marked Change in Motor—Efforts to Obtain Silent Operation

Carbureter Has But One Adjustment—Combined Electric Ignition, Lighting and Starting System Improved

CADILLAC cars for 1913 are in seven body styles, all of which are mounted on the one chassis as heretofore. Although a number of mechanical changes have been made—principally in the motor—the general Cadillac design features still hold.

The motor, while presenting all of the standard Cadillac features, such as separate copper water-jackets, separate cylinder heads of the L-type and five-bearing crankshaft, has a greatly increased stroke over that of 1912. This dimension has been increased from 4 1-2 inches to 5 3-4 inches. The cylinder bore remains at 4 1-2 inches, giving a stroke-bore ratio of 1.28, and putting the Cadillac motor unquestionably in the long-stroke class. The horsepower is increased 18 to 25 per cent. depending on the speed, the greatest percentage of increase being evidenced at speeds ranging from 12 to 35 miles an hour. This is due, of course, principally to the lengthening of the stroke. The S. A. E. horsepower rating for a motor of this bore is 32.4, but the rating which is given the car by the makers, and which is actually developed on block tests is from 40 to 50 horsepower.

Details of Motor Construction

The four cylinders are cast single, as shown in Figs. 1 and 2. The construction is shown clearly in the sectional view of one of the cylinders, Fig. 8. This cylinder design is peculiar to the Cadillac motor and has been used for a number of years. The cylinder heads H_1, Fig. 8, which contain the valve chambers are attached to the cylinders by right and left threaded nipples N_1. The water jackets W_1, which surround the cylinders are of spun copper and are so clamped in position, as shown in Fig. 8, as to preclude any possibility of water leak, it is claimed. The idea of the Cadillac designers in using this peculiar construction is that with an even thickness of cylinder walls and of water jacket, space is afforded around all the cylinders. It also makes it possible to replace any part of any cylinder without disturbing the rest.

The main bearings and lower connecting-rod bearings have all been increased in diameter and in length, which along with the five-bearing crankshaft make an extremely rigid construction, and serve to reduce whipping stresses and motor vibration. The camshaft has also been enlarged from a diameter of 3-4 inch to 1 3-16 inch, and it is mounted on three bearings instead of five as formerly. This three-bearing mounting is made possible because of the larger size and consequent greater strength of the camshaft. The cams are integral with the shaft.

The sizes of the various motor bearings are listed:

Crankshaft—Five bearings. Rear: Diameter, 2 inches; length, 4 inches. Remaining four: Diameter, 2 inches; length, 2 7-8 inches.

Camshaft—Three bearings. Diameter, 1 3-16 inch.

Wrist Pin Bearings—Length, 3 inches; diameter 3-4 inch.

Silent Operation a Feature

The crankshaft and generator shaft on the motor are driven from the crankshaft by silent chains which replace the meshed gears and tend to increase the motor's silence. The chain drive arrangement is shown clearly in Figs. 9 and 10. The valves are all inclosed separately by a special form of housings as shown at V, Fig. 6. The inlet and exhaust valves have been increased from their former diameter of 1 3-4 inch to 2 1-8 inches. All valves are interchangeable and are operated by the single camshaft on the right side of the motor. The valve tappets do not bear directly upon the cams, the lower end of each cam block being provided with a roller, which is constantly in contact with the cam.

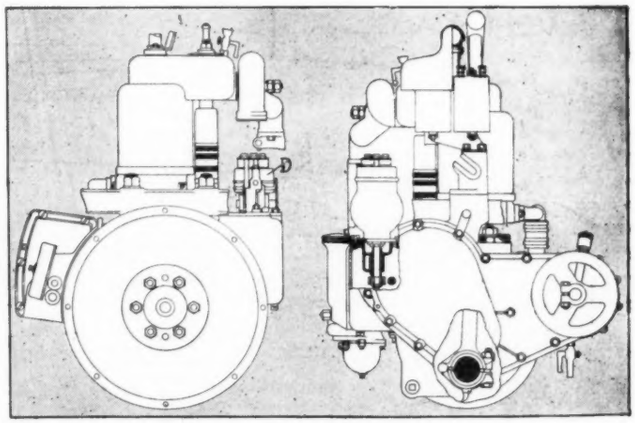


Fig. 3—Rear view of Cadillac 1913 motor

Fig. 4—Front of motor, showing hinged connecting-rod end

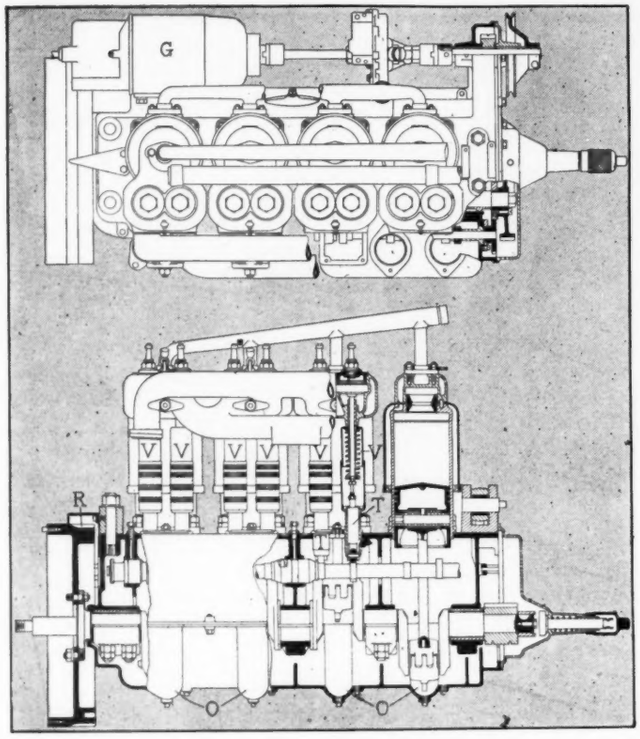


Fig. 5—Top view of the Cadillac engine, showing position of generator G

Fig. 6—Right side sectional view of motor, showing manner of inclosing valve springs and cylinder construction

The lubrication of the motor remains unchanged and is of the automatic splash type, the oil supply being maintained by a mechanical force-feed lubricator. There is a sight feed on the dash. The oil pan part of the crankcase is divided into four compartments into which the lower ends of the connecting-rods dip. The oil reservoir is at the right side of the motor, being a part of the base. In this reservoir to which the oil finally passes there is a double-acting force pump which forces the lubricant up through the sight feed on the dash and thence to the crankcase compartments. The sloping troughs on the sides of these compartments distribute the oil from one trough to another and maintain a constant level in all of them. These individual oil troughs for the lower connecting-rod ends are shown at O in Fig. 6. They are provided with drain plugs to remove all the lubricant for cleaning or other purposes.

The Cadillac carbureter for 1913 has only one adjustment, that being for the air supply. The gasoline adjustment is fixed. There is, however, an auxiliary air adjustment on the steering column. To assist in vaporization, the carbureter is water-jacketed, which is an especial advantage in cold weather.

Improved Delco System Used

The cooling system is continued as on former models, the radiator being a Cadillac design consisting of 147 seamless copper tubes which pass vertically through 145 horizontal copper plates. Cooling is assisted in the conventional way by the use of a belt-driven fan at the forward end of the motor. The fan belt tension is regulated by adjusting the center distance of the fan pulleys.

The electrical system of the Cadillac is of the Delco type, somewhat improved from its form as applied to the 1912 model. This system combines all the electric functions of ignition, lighting and starting. The generator, which is temporarily converted into a motor when required to start the car, is on the rear left side of the motor at G, Figs. 2 and 5. The Delco system has been explained on numerous occasions in the THE AUTOMOBILE and will be only briefly taken up here. For starting the engine, the closing of a switch within the driver's reach temporarily transforms the generator into a motor. Pushing forward on the clutch pedal causes a gear of the electric motor to mesh with teeth cut in the outer rim of the flywheel as shown at R, Figs. 10 and 6. The electric motor then turns the flywheel and the crankshaft until the engine takes up its regular cycle of operation, after which the clutch pedal is released, disengaging the gears. The starting switch is then cut off and the generator operates as a generator and is driven by gears from the engine, furnishing current for ignition, for lighting and for charging the storage battery.

Igaition and Lighting Improvements

The ignition system consists of two complete, independent circuits and there are two sets of spark-plugs. In addition to the generator, there is a set of dry cells for emergency use and for furnishing ignition current when the storage battery energy is being used for driving the temporary motor which starts the gasoline motor. After the engine is running the dry cell current is cut out and the generator current switched on by means of a switch under the driver's control. In connection with the dry cell current a Delco distributer, shown at D, Fig. 1, is employed. Current for lighting head, side and tail lamps is furnished by the storage battery when the motor is idling or not running, while after it is up to speed the generator current becomes sufficient to provide for the lamps. Any excess current produced is passed to the storage battery. This current distribution is all provided for by automatic control switches. The storage battery has a capacity of 130 ampere-hours, and as soon as that capacity is reached the charging automatically ceases. Up to 280 to 300 revolutions a minute the ignition current comes from the storage battery but above that speed it is sent automatically direct to the spark-plugs from the generator.

By using two windings and two commutators on the generator armature, one for use when the electrical unit is driven as a generator and the other when used as a motor, it is possible to operate the motor-generator on 6 volts. This permits of the doing away with the formerly-used control switch and ampere-hour meter. The voltage regulator determines the rate of charge to the storage battery and the voltage to the lamps. It provides for the charging of the storage battery at a rate depending upon the condition of the battery. That is, a fully discharged battery is charged at a high rate, and vice versa. On the new model the gearing between the electric motor and the flywheel is made about 25 to 1, instead of 20 to 1 as heretofore. This change increases the cranking speed of the motor and the duration of cranking time. Another improvement in the system is in the spark timing which is automatically controlled by a ring governor, making it unnecessary to constantly regulate the spark lever on the steering wheel quadrant. The wires to the side lights are run through

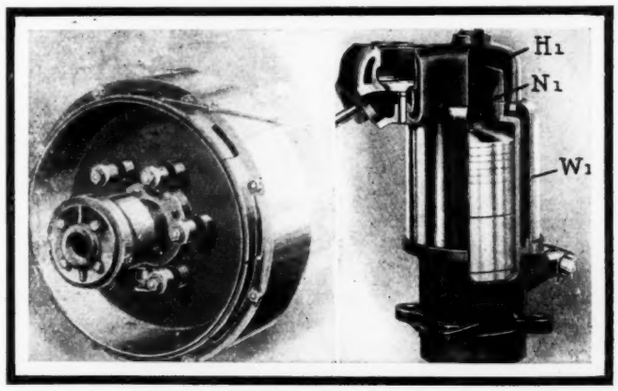


Fig. 7—The Cadillac cone clutch with spring ring in the flywheel

Fig. 8—Showing cylinder construction. Cylinder-heads and water-jackets are separate

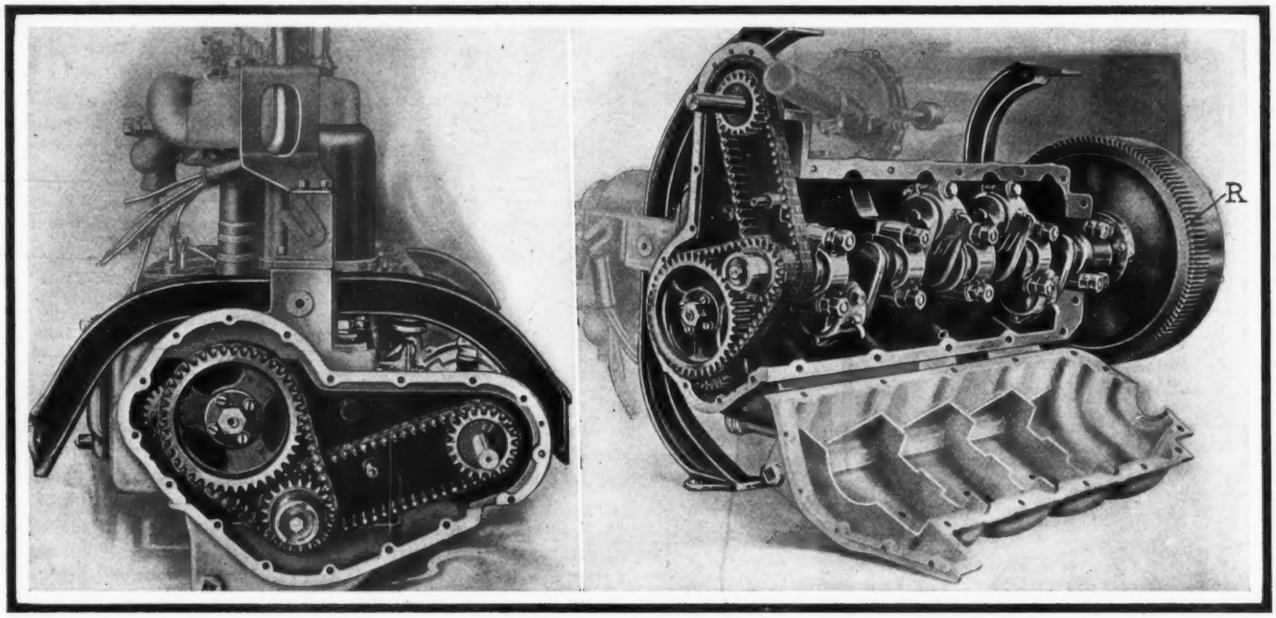


Fig. 9—Front view of Cadillac motor, showing silent-chain driven pump and cam shafts

Fig. 10—Bottom of motor, illustrating 5-bearing crankshaft and oil compartments

the brackets which hold these lamps and are therefore invisible. This is a new feature. Fuses have also been placed on all lights and a Yale lock has been put on the ignition switch.

In considering the remaining features of the car, the clutch is next in order. It is of the cone type and leather faced, and has a special spring ring in the flywheel. This ring with which the cone engages is split at eight points of its periphery and part of each section is sprung inward. The idea of this arrangement is to make the clutch take hold gradually and to eliminate all the shock and jar which results from the clutch taking hold fiercely when starting the car.

The transmission is of the selective, three-speed, sliding-gear type with direct drive on high. Gears, transmission shaft and clutch shaft are of chrome nickel steel. The gear teeth are beveled in the conventional way. A view of the gearset is shown in Fig. 11. The main transmission shaft, the jackshaft and the clutch shaft revolve on a total of five annular ball bearings. The drive from the gear-box to the rear axle is by means of a heat-treated, carbon steel shaft, fitted with two universal joints. These are provided with hardened and ground bushings and pins. The joints are inclosed in spherical housings and run in oil baths. The forward universal is telescopic and is so constructed as to be self-centering. The torsion member is V-shaped and tubular. The rear axle is of Timken floating type with bearings of the same make, throughout. The driving pinion and bevel gear are of a special carbon steel. The front axle is drop-forged of I-beam section and has drop-forged yokes, spring perches, tie-rod ends and steering spindles. The front wheel spindles of the new chassis are fitted with Timken bearings at the top.

Brake and Chassis Specifications

The brakes are of the conventional type, bolted to the rear wheel spokes, drums with diameter of 17 inches and a width of 2 1-2 inches. Wheels are of artillery type and fitted with demountable rims. They carry 36 by 4 1-2-inch tires, whereas last season the tires were of the 36 by 4-inch size.

The frame is of pressed-steel channel, double-dropped a total of 2 1-2 inches. The frame width in front is 30 inches and 33 inches at the rear. The entire frame has been dropped 1 inch, giving the car 1-2 inch more action by lowering the front axle 1 1-2 inches more than last season.

The spring suspension is of the standard platform type in the rear while the front springs are half-elliptic. The rear side springs have been made 4 inches longer than on the previous model. The present spring sizes follow:

Front—Length, 36 inches, width, 2 inches.

Rear Sides—Length, 48 inches; width, 2 inches.

Rear Cross—Length, 39 1-2 inches; width, 2 inches.

The steering gear is shown in Fig. 12. It is of Cadillac worm and worm-gear sector type. It is adjustable and is provided with ball thrust bearings. The steering wheel has a diameter of 18 inches and has its rim corrugated. The spark and throttle levers have the usual location on the quadrant above the wheel.

A new feature this year is the placing of the emergency brake inside the car, making it possible to use the right front door.

On the new model the wheelbase has been increased 4 inches from 116 inches to 120 inches, while the tread is 56 inches. This serves to make the body more roomy and adds to the comfort of the passengers.

All open bodies are of sheet-steel construction, while the closed bodies have aluminum sides. A cowl appears on all the new open bodies instead of the dash, while the fenders follow the lines of the wheels. In all respects the new bodies are most attractive in appearance and the upholstery is of such a character as to make easy-riding a feature. The standard equipment for 1913 will include mohair top and side curtains, windshield and speedometer. These were not given as part of the regular equipment last year. A full complement of tools and accessories for all contingencies is found on 1913's Cadillac.

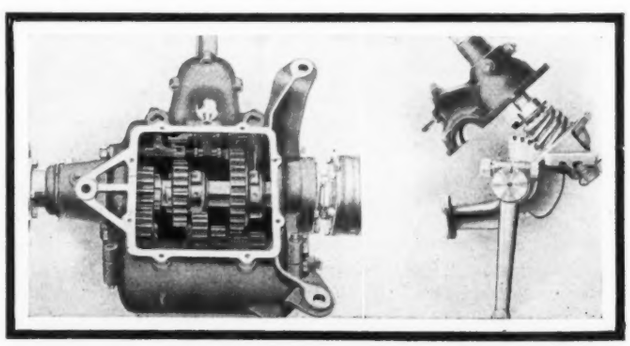


Fig. 11—The Cadillac 3-speed, selective, sliding gearset, showing suspension points

Fig. 12—The steering gear, which is of the worm and worm-gear sector type

La France Hauls Big Load

Pulls 11 Tons Up an 8 Per Cent. Grade 100 Yards Long at a Rate of 5 Miles an Hour

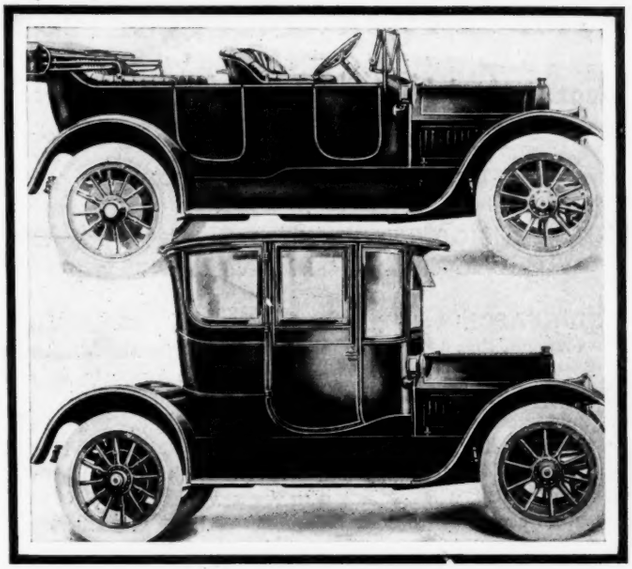
IN a demonstration of the 5-ton American-La France truck, manufactured by the American-La France Engine Company, Elmira, N. Y., which was given at Bergen, N. J., last Friday, this truck, which is equipped with a 40-horsepower, four-cylinder engine, hauled a total load of over 11 tons up an 8 per cent. 100-yard hill at a rate of 5 miles an hour. The truck has a wheelbase of 143 inches and an overall length of 227 inches, and a loading space of 154 square feet. It is equipped with a Manly hydraulic-drive system, which takes the place of clutch, transmission and differential.

For the demonstration the truck was loaded with about 11,200 pounds of bricks and a trailer was attached to it, which carried 11,550 pounds. This load was first transported over a level road about 1 mile in length at an average speed of 11 miles an hour, after which the train was driven up the hill. The train was stopped several times in the middle of the hill and was started again without any trouble.

Manly Transmission a Feature

The principal feature of the La France truck is the Manly hydraulic transmission. It consists of a five-cylinder piston pump, in which the cylinders are arranged in star manner around the driveshaft, which is directly coupled to the crankshaft of the automobile motor, and two similar devices on the jackshaft which are driven by the pressure of the oil entering them from the five-cylinder pump, thus acting as water motors which drive the sections of the rear axle by means of chains. The five piston plungers of the pump bear on a bushing which incloses an eccentric of the pump-drive shaft. The eccentricity of the bushing may be altered by an ingenious mechanism controlled by the driver so that the stroke of the pumps may thereby be changed, resulting in a corresponding change of the quantity of oil transported by the pump and an inversely proportionate change of pressure exerted by the pump on the oil forced into the motors on the jackshaft. When the control lever, which is attached to the steering post, is thrown forward, the stroke of the pump is lengthened and the speed of the whole system is increased, while a backward movement of the lever reduces the stroke, and eventually causes the eccentric to become concentric with the pump shaft and the pump stroke to become nil. This locks the oil in its passage and makes the motors act as brakes on the rear wheels. While the use of this drive makes the clutch superfluous, a device is used which serves its purpose. This is a by-pass valve, controlled by a pedal on the driver's seat, which interrupts the passageway from the pump to the liquid motors and causes all the oil to be circulated directly from the outlet back into the inlet of the pump.

American-La France truck and trailer, hauling a load of 11 tons of bricks over a Jersey hill at 5 miles an hour



New Cadillac body styles: Fig. 13—The touring car type. Fig. 14—The new coupe model

The accompanying illustration shows the 5-ton truck and trailer with the oil motors on the jackshaft. The absence of the propeller shaft is also noticeable, a pipe which branches from the pump to the two motors taking its place. The return of the oil to the pump is through two pipes laid directly under the loading platform.

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Taxicabs for English Maneuvers

From the 1st of August until the middle of September there will be 500 fewer taxicabs in commission in the streets of London than usual. The War Office has commissioned these vehicles for use during the autumn maneuvers. The bodies of the taxicabs are removed, after which transport wagon bodies are fitted to the engines. The general scarcity of qualified cavalry horses in the British army is responsible for the innovation. At the same time it all goes to illustrate the impromptu efficiency of the motor vehicle in a case of emergency.

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From Paris to Lyons is 320 miles. It is over this course that a successful trial has just been made with a "winged motor car." The car, designed by M. Bertrand de Lesseps, was driven by a revolving wing. In appearance the vehicle is not unlike an ordinary automobile, save that it is shaped like the prow of a ship in front. The wing is small, thick and strong, and revolves within a protecting cage. The engine, of 40 horsepower, rotates the wing by means of a shaft and chain transmission. No other mechanism is in evidence, the wheels of the car being free except in the matter of foot brakes. A single lever controlling the clutch is beside the driver, this lever also controlling the forward and reverse movement of the wing. The latter can be reversed at a moment's notice, thus affording an additional brake. The car weighs 1,300 pounds and attained a speed of 62 miles per hour with the wing making 2,100 revolutions each minute. The inventor is convinced of the car's practicability and hopes to capitalize his invention in the near future.

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OWING to a mistake in calculation, the population per car in the state of California as given in the statistical story in the issue of THE AUTOMOBILE for July 25 was 300, whereas that state should have headed the list with one automobile for every thirty of the population.

Mais Truck Reorganized

Incorporated With $1,000,000 Capital—New Company Is Largely Composed of Stockholders in Old Company

Mortgage of $10,000 on the Plant—Stockholders in Old Concern to Receive Nothing

INDIANAPOLIS, IND., Aug. 21—The Mais Motor Truck Company has been reorganized and incorporated with $1,000,000 capital by the purchasers of the property at receiver's sale. Frank H. Wheeler, of Wheeler and Schebler, who will hold one-half of the stock, is the new president. Walter M. Pearce, Rushville, Ind., is vice-president, while Alvin S. Lockard, Indianapolis, is secretary and treasurer. William H. Brown, former president, will continue with the new company. The officers and Jacob V. Stimson, Huntingburg, Ind., and Harry G. Francis, Rushville, will constitute the board of directors.

The new management is composed largely of stockholders in the old company. Stockholders of the old concern will realize nothing on their shares. The new company has assumed a mortgage of $10,000 on the plant beside paying $71,000 for the assets.

Only one bid was submitted for the purchase of the company and the property was sold by the receiver, Franklin Vonnegut, to Frank H. Wheeler, of Indianapolis, and Walter N. Pearce, and N. G. Francis, of Rushville. The purchase price is $71,000 and the sale, of course, is subject to the approval of the court, which is in vacation.

Mr. Wheeler declined to give any details as to the future of the company until the sale is approved by the court. Mr. Francis and Mr. Pearce are stockholders in the old company. Mr. Wheeler will control about 50 per cent. of the stock.

Besides getting the plant and equipment, the purchaser will get about $12,000 in accounts and $10,000 in notes receivable. One-third of the sale price is to be paid in cash; one-third in 12 months and the remaining one-third in 18 months.

The receiver filed the following inventory in court: Finished stock, including two shop cars and parts in assembly, $26,759.32; automobile parts, now in process of machining, $6,327.89; automobile parts in the rough, consisting of rough castings and all unfinished parts, $19,481.55; bar steel, brass and steel tubing, $7,887.17; machinery, $55,236.82; factory equipment and supplies, including all belts, pulleys, motors, starting boxes, etc., $10,778.53; office equipment $2,784.05; paints, oil, etc., $460.56; patterns, manufacturing cost, $7,804.36; jigs and tools, manufacturing cost, $13,439.67 and real estate and buildings, $30,000. Total, $180,959.92.

The receiver expects to have approximately $85,000 to divide among the creditors. The liabilities of the company are said to amount to approximately $250,000.

Swinehart Declares Dividend

AKRON, O., Aug. 19—The Swinehart Rubber Company has declared a quarterly dividend of 1 1-2 per cent., which means the reduction of the regular dividend from 8 to 6 per cent. In a letter sent out with the dividend checks the statement was made that the company deemed it advisable to reduce the dividend and build up a larger working capital.

Rubber Trade Doubts Pool Rumors

No pressure to sell was apparent in the crude rubber market recently and the buying, while steady has been in jobbing quantities only. Little credence is placed in the reports of another giant scheme of valorization and the position is taken by many of the consumers that even should the plan be adopted, it is likely to have no more success than the one which was attempted last year.

The 1911 idea was financed under the auspices of one of the Brazilian states and bonds were issued to buy about 15,000,000 pounds at an average of $1.10 a pound. This rubber was retired from the market and the price advanced to $1.70. At that figure trade became stagnant and every attempt to liquidate the valorized stock found a sinking market with no buying force in it anywhere. The holders of the valorized stock became panicky at last and the whole mass of rubber was sold at about $1.18 a pound average. On the face of affairs the pool made a gross profit of $1,200,000 but as a matter of fact, brokerage, interest, commission, freights, storage and other items of cost brought the money level of the product to $2.60 per pound which netted the holders a stunning loss of over $18,000,000.

With the experience of the state-promoted pool in mind, the rubber trade does not figure that the present rumors of valorization are founded on much of a fact basis. Current prices are based upon about $1.19 1-2 per pound for up-river fine.

Bergdoll Agrees to Take Motors

PHILADELPHIA, Aug. 19—The legal hostilities between the Louis J. Bergdoll Motor Company, of this city and the Westinghouse Machine Company, of Pittsburgh, were finally adjusted and

Automobile Securities Quotations

Goodrich common was the strong feature of the market for automobile securities during the past week. The stock advanced 5 points on impressive investment buying caused by excellent preliminary reports of extended business. Firestone was another strong feature among the tire makers. There was some realizing on recent purchases of Studebaker common and the market yielded a point as the result of such trades. General Motors was steady and United States Motor was fractionally lower on profit-taking sales. Reports from the manufacturing and accessory industries were all rosy. One of the most significant basic features of the market was the quiet strength of Rubber Goods. An outline of the reorganization plan for United States Motor will probably be announced early next week. Rumors as to changes in the personnel of the company have been circulated for a week but lack color of official sanction. Chairman W. E. Strong has announced that the 1912 business is closed and that so far the 1913 situation is satisfactory.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	145	165
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	99	102
American Locomotive, common	38	38¼	45¾	46¼
American Locomotive, preferred	106	107	109	110
Chalmers Motor Company	..	..	145	150
Consolidated R. T. Co., common	5	10	16	18
Consolidated R. T. Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	175	180	283	290
Firestone Tire & Rubber Co., pfd	105	107	106	108
Garford Company, preferred	..	..	99	101
General Motors Company, com	46½	47½	36¼	36¾
General Motors Company, pfd	82½	84	79	79½
B. F. Goodrich Company, common	242	245	77	77½
B. F. Goodrich Company, pfd	116½	118	107¼	108¼
Goodyear Tire & Rubber Co., com	230	240	330	334
Goodyear Tire & Rubber Co., pfd	105	107	105	107
Hayes Manufacturing Company	..	..	..	97
International Morot Co., com	..	..	27½	25½
International Motor Co., pfd	..	..	84	85
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	142	150
Packard Motor Car Co., pfd	..	..	105	107
Pope Manufacturing Co., common	45	50	39	40
Pope Manufacturing Co., pfd	77	81	74	75
Reo Motor Truck Company	8½	10	9¾	10¼
Reo Motor Car Company	23	25	22	24
Studebaker Company, common	..	..	44	45
Studebaker Company, preferred	..	..	95	96¼
Swinehart Tire Company	..	..	95	97
Rubber Goods Company, common	..	..	100	105
Rubber Goods Company, pfd	..	..	107	110
U. S. Motor Co., common	32	33½	41¼	41½
U. S. Motor Co., preferred	74	75½	17¾	18¼
White Company, preferred	..	..	107½	..

settled when full satisfaction was entered on the records of court of Common Pleas No. 4.

In May, of 1910 the Westinghouse company contracted to build for the Bergdoll company 1,000 gasoline motors to be delivered at the rate of not less than 100 per month. After receiving and paying for 600 of the 1,000 motors the Bergdoll company declined to receive or pay for the balance, alleging as its reason, failure on the part of the Westinghouse company to make deliveries as agreed, and consequent losses in sales of automobiles in the construction of which the motors in question were to be used. As a result the Westinghouse company brought the above action.

By the terms of settlement the balance of the motors are to be shipped to the Bergdoll company as its needs require.

Atlas Plant Closed Temporarily

SPRINGFIELD, MASS., Aug. 19—The Atlas Motor Car Company has practically closed its plant temporarily because of its inability to secure motors for its product. Plans are under way for a directors' meeting at which the capital stock will be increased from $250,000 to $350,000 and an arrangement made to build the motors at the plant. The question of a reorganization will also be discussed. The company has orders approximating $200,000 on its books and these would be largely increased if the company had not been handicapped just at this time in getting motors.

Market Changes for the Week

The most important feature of the week's market was the advance in the price of Bessemer and open-hearth steel. Each advanced $1.00 on Monday, as a result of the pressure for shipments. Copper experienced a fractional loss in price on Thursday, remaining unchanged throughout the week. Tin was also a prominent feature of the metal market this week, due to active speculative operations, advancing the price 75 cents per 100 pounds. Fine up-river Para rubber rose 2 cents a pound during the week, closing at $1.19. Lead advanced 5 cents on Tuesday, being much firmer in tone, closing at $4.55.

Oil and lubricants remained at their old prices, with the exception of cottonseed oil and linseed oil, the former varying in price throughout the week, closing with a loss in price of 3 cents. Linseed oil closed at 68 cents, experiencing a loss of 2 cents, due to lack of interest of the consumers. Gasoline remained unchanged. Antimony advanced 1-2 cent a pound on Thursday, closing at 7 5-8 cents per pound. The variations for the week follow:

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.....	.07⅛	.07⅜	.07⅝	.07⅝	.07⅝	.07⅝	+ .00½
Beams & Channels, 100 lbs.....	....	....	....	....	....	....	.....
Bessemer Steel, Pittsburgh, ton.	21.50	21.50	21.50	21.50	22.50	22.50	+1.00
Copper, Elec., lb.	.17½	.17½	.17½	.17½	.17½	.17½	.....
Copper, Lake, lb.	.17¾	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	— .00⅛
Cottonseed Oil, August, bbl....	6.41	6.50	6.50	6.50	6.43	6.38	— .03
Cyanide Potash, 1 lb.....	.19	.19	.19	.19	.19	.19	.....
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.33	.....
Gasoline, Auto, 200 gals. @.....	.21	.21	.21	.21	.21	.21	.....
Lard Oil, prime..	.85	.85	.85	.85	.85	.85	.....
Lead, 100 lbs.....	4.50	4.50	4.50	4.50	4.50	4.55	+ .05
Linseed Oil.....	.70	.70	.70	.70	.68	.68	— .02
Open-Hearth Steel, ton.....	22.00	22.00	22.00	22.00	23.00	23.00	+1.00
Petroleum, bbl., Kansas crude...	.70	.70	.70	.70	.70	.70	.....
Petroleum, bbl., Pa., crude.....	1.60	1.60	1.60	1.60	1.60	1.60	.....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	.....
Rubber, Fine Up-river Para...	1.17	1.17	1.18	1.18	1.19	1.19	+ .02
Silk, raw Ital..		4.15	....	....	4.15	....	.....
Silk, raw Japan...		3.70	....	....	3.72½	....	+ .02½
Sulphuric Acid, 60 Beaumé.....	.99	.99	.99	.99	.99	.99	.....
Tin, 100 lbs.....	45.88	45.70	45.75	45.75	45.95	46.63	+ .75
Tire Scrap.....	.09	.09	.09	.09	.09	.09	.....

Insurance Men Plan Boost

Point to Rise of Automobile Accidents From 3 to 22 Per Cent. of Causalty Total as Reason for Increase

Overlook Basic Cause for Excessive Losses Which Result From Present High Rates

HARTFORD, CONN., Aug. 17—Bertrand A. Page, vice-president of the Travelers' Insurance Company, of Hartford, Conn., has just returned from the convention of the International Association of Casualty and Surety Underwriters, held at Fortress Munroe, where he read a paper on the question of motor accident insurance. He pointed out that because the losses due to automobile accidents amounted in 1911 to almost 22 per cent. of the total accident insurance men are becoming very much alarmed. He showed that in 5 years prior to 1906 automobile losses amounted to less than 3 per cent. of all losses, rising rapidly since then. To meet this the insurance men are considering higher rates or less liberal policies. Among other things he said:

Ten years ago, roughly estimated, there were less than 100,000 pleasure automobiles in the United States and Canada. To-day there are at least 900,000 in use. While the auto claims have been steadily on the increase, there has been no appreciable diminution in horse and vehicle accidents. The average amount paid for claims under this heading for the 5 years, 1902 to 1906 inclusive, was 10.4 per cent. of the total losses. In the year 1911 we find horse and vehicle accidents constituting 6.6 per cent. of the total in amount of claims, and automobile accidents 21.8 per cent. of the total.

Indemnity claims from auto accidents May, 1906, to April 1, 1912, in the amount paid were in excess of the death losses during the same period; 548 claims were paid last year for cranking accidents alone. Of the 1335 auto claims in 1911 1317 were for indemnity losses.

It is our experience that the greater number of claims do not come from the reckless use of an automobile, and from the nature of the accidents they might occur to anyone however cautious and conservative. When the automobile first came into popular use it was assumed that an extra rate to cover the hazard was not expedient, because the proper use of an automobile is one of the customary diversions of outdoor life. We do not contend that it is any more hazardous to run an automobile now than it was ten years ago, but we do contend that because of its use being almost universal, the exposure is one which must be considered in connection with insurance of the select and preferred classes. That the average automobile owner personally operating and caring for same should pay an extra rate is evident from the figures heretofore quoted. There are those who cannot safely be insured at less than extra special hazardous.

We charge a chauffeur $10 per $1000—yet his position depends on his care in operating the car. He is experienced and does the right thing instinctively. He has nothing to divert his mind. His interest is not in scenery nor the beautiful ladies who adorn the tonneau. He has not spent the evening at the club, and if he wished to hold his position he learns early that there is a strict prohibition, applicable to chauffeurs only, against the mixing of alcohol and gasolene, even in small quantities.

It cannot be said that exposure is only an incidental one, such as hunting, fishing and other sports. The insured is at it daily or nightly from eight to twelve months in the year. We can assume the hunting hazard for two weeks to a month each year, but if our insured makes hunting his business we advance his rate from $5 to $15 per $1000.

Much has been said about the necessity for higher rates or a less liberal policy contract. With automobile accidents constituting in the year 1911 about 22 per cent. of the claims in amount and over 10 per cent. in number, it would appear that the remedy for the situation lies in the securing of an adequate rate in connection with the insurance of those who use automobiles daily. It is unfair to charge the non-user for the claims incurred by his more exposed neighbor.

Ten years ago there was practically no such thing as an automobile accident. Last year, claims from select, preferred and ordinary class risks were increased by automobile accidents 28 per cent., and this does not take into account horse and vehicle accidents caused by automobiles, nor injuries to pedestrians and persons on bicycles, motorcycles, etc., who were run over or into by autos. During the past few years, the automobile has been the big factor in increasing claim loss ratios, although unwarranted liberalizations in the policy contract have not been without their effect.

Carl Fisher Buys Into Esterline

INDIANAPOLIS, IND., Aug. 19—Carl G. Fisher and James A. Allison of the Prest-O-Lite Company, this city, have bought $100,000 of the capital stock of The Esterline Company, West Lafayette. The plant will be moved to the new horseless city, near the Indianapolis Motor Speedway.

The Esterline Company manufactures a graphic registering meter and various electrical specialties, including an adaption of the Berden system of electric lighting for motor cars. The company has an authorized capitalization of $200,000 and employs 200 men.

Canadian Ohio Stock Out

Company Puts $90,000 Worth of 7 Per Cent. Cumulative Preferred on the Market

Factory Will Be Established at Colborne, Ont.—Working Agreement With American Ohio Company

TORONTO, Aug. 19—The Canadian Ohio Motor Car Company for public investment $90,000 worth of 7 per cent. cumulative preferred stock at $100 per share, carrying a bonus of 25 per cent. common stock.

The manufacturing plant will be established at Colborne, Ont., where the company has been granted a valuable site and exemption from taxes for a period of 10 years.

The operating agreement between the Ohio Motor Car Company and the Canadian Ohio Motor Car Company is of material advantage to the Canadian company, inasmuch as it provides that the Canadian company shall have the exclusive right to manufacture and sell the "Ohio" car, and to the use and benefit of all patents, blue prints, tools, dies and general engineering, together with free service of the draughting department of the American company, and to receive the benefit of all experimental work both now and in the future, of the American company.

Canadian Foreign Trade Lively

MONTREAL, Aug. 19—It has been known for some time past that the Montreal office of the New Zealand Shipping Company has been placing a number of Canadian made automobiles in Australia and New Zealand, but few will be prepared to hear the dimensions to which this trade has grown. During the year ending May 1, 1,292 Canadian automobiles had been sent by New Zealand liners, and it is hoped to forward at least 1,800 during the ensuing year. The total number already shipped from the opening of the summer navigation season to date is 629.

The Shell company, of Canada, advises that a large cargo of gasoline was shipped on board the steamer *Electra* which sailed from Singapore for Montreal on August 5. The shipment comprises 1,500,000 gallons of gasoline and is expected to arrive in the harbor before the end of September. It will be discharged at the Racine pier.

Fall Motor Festival in Chicago

CHICAGO, Aug. 19—Plans have been made by the Chicago Automobile Trade Association for its annual fall festival, which has been scheduled for the week of September 14-21. In reality this is to be a street show, with Michigan avenue lighted at night, all the stores decorated and the 1913 models on view. As attractions there will be parades and other affairs which will bring out the prospects. The opening night there is to be a parade of commercial vehicles, which will include those machines which have taken part in the Chicago Motor Club's demonstration, which has been scheduled for September 10-13.

Gotham Protests High Gasoline

High local gasoline prices have brought about a storm of protest from New York garage proprietors who claim that the metropolitan district is being subjected to adverse discrimination on the part of the oil companies. According to leaders in the business, the price of gasoline sold to automobilists in New Jersey, Connecticut and up-state is around 18 cents a gallon while they are obliged to sell at 20 and 25 cents a gallon in order to break even on their gasoline business.

They state that the local government will be obliged to charge 30 cents if there is to be any material profit in the business. The point is made that the garage operators realizing that gasoline at an exorbitant level will tend to check the use of the automobile are heartily in favor of a readjustment of prices so as to foster wider use of the car.

A meeting has been called early in September when the whole matter will be threshed out from the viewpoint of the garageman and the user.

The Standard Oil Company denies any discrimination against New York and states that the level of prices established in New York applies equally to all the metropolitan territory. This price is 16 cents a gallon in wholesale lots and 21 cents a gallon delivered to garages in steel barrels in lots of 200 gallons or more.

The reason for the difference in prices is said to be founded upon the overhead charges of the local trade including the expensive equipment necessary for handling gasoline under the local ordinance, higher rentals and the price of labor here as against the cost of running a country garage.

N. A. A. M. Clears Show Issue

Some confusion in the minds of the trade may have arisen through the unwarranted use of the term National Show Circuit, as applied to the local show circuit, some of preparations for which have been handled by the National Association of Automobile Manufacturers.

The facts in the case, according to official announcement of the N. A. A. M. are that the only national shows to receive sanction are those to be held in New York and Chicago. At all others, manufacturer as such are barred from participation.

But, a circuit of dates for local shows which shall be handled and entered only by the local trade and for which manufacturers are authorized to loan a chassis or show car and to be represented by salesmen, if desired has been arranged as follows:

Cleveland, January 6-11.
Philadelphia, January 20-25.
Detroit, January 27, February 1.
Minneapolis, Feb. 10-15.
Kansas City, February 17-22.
Pittsburgh, March 3-8.
Boston, March 8-15.
Buffalo, March 17-22.

The dates February 24, March 1 will be assigned in a short time.

Vancouver Show in Full Swing

VANCOUVER, B. C., Aug. 15—The Vancouver second annual automobile show held under the auspices of the British Columbia Auto and Motor Trades Association and Premier McBride, is now in full swing, and is one of the finest automobile displays ever seen in Western Canada.

The exhibit embraces cars of every description—commercial and pleasure, gasoline, steam and electric, as well as a wide range of all motor accessories.

A little over 2 years ago there were twenty motor trucks in this city, and at present there are over 200.

There are in this city about 1,700 power-driven machines, including motorcycles and business trucks.

BUFFALO, N. Y., Aug. 20—The pathfinding crew for the third annual reliability run of the Buffalo Automobile Club to be made September 11-14 completed its labors Friday night in the Studebaker 30 car, which was sent from Detroit for the work of mapping out the course to be taken on the annual run. In the 4 days consumed for the completion of the course to be taken, 838 miles were traversed, the pathfinder returning to Buffalo every evening. An average of 210 miles daily was made by the pathfinder.

The winner of the reliability tour will be awarded sweepkstakes trophy for the ensuing year.

Peugeot Enters at Elgin

Grand Prize Winner and Two Other Cars of That Make Scheduled to Compete

Boillot, Goux and Zuccarelli, Grand Prize Pilots, Probably Will Be the Drivers Chosen

CHICAGO, Aug. 21—The Peugeot car which won the French Grand Prix will contest for racing honors in America, with its first appearance in the Elgin road races of August 30-31, in which it will be entered in the Elgin National Watch Company trophy race and the free-for-all. From Elgin the team will proceed to Milwaukee for the Grand Prix and Vanderbilt cup races.

A cablegram received by Paul Lacroix, American representative of the Peugeot, announced Monday that the three cars that raced in the French Grand Prix were already on the water, accompanied by three drivers, with the intention of taking part in in the American road races. It is anticipated that they will reach New York Saturday and be shipped immediately to Chicago, reaching Elgin on Tuesday, where they will be given a couple of days for practice. Just who the drivers are is not known, but it is anticipated that they are Boillot, winner of the Grand Prix, Goux and Zuccarelli.

Following this cablegram E. C. Patterson, of Chicago, and R. J. Collier, of New York, who started the movement to import the Peugeots, agreeing to be sponsors for them in the American races, made four entries in the Elgin road races—each being represented in two races on the second day. The third car also will be entered by Mr. Patterson as soon as he is notified by Mr. Lacroix that this can be done. These entries are made provisional on the cars getting here in time, which seems most likely now. If the cars race at Elgin, both Mr. Patterson and Mr. Collier will enter them at Milwaukee also.

Many Expert Drivers Entered

The French dressing given the races adds greatly to the International flavor of the contests which are being promoted by the Chicago Automobile Club, and the Elgin Automobile Road Racing Association, for already nominated are the Fiat of Italy, and the Benz and Mercedes, of Germany, while the American representation consists of the Knox, National, Stutz, Mercer, Mason, Falcar and Herreshoff.

The roll-call of drivers engaged shows a rare lot, consisting of the French trio, Teddy Tetzlaff, Erwin Bergdoll, Ralph Mulford, David Bruce-Brown, Hughie Hughes, Spencer Wishart, Harry Endicott, Len Zengel, Billy Knipper, Charley Merz, Gil Anderson, George Clark, Neil Whalen, W. G. Wordingham and several others. In the case of Bruce-Brown, his entry hinges on his closing a deal with E. E. Hewlett of Los Angeles for the same Fiat which he drove at Savannah last fall. Bruce-Brown's car which he drove in the French Grand Prix was not shipped from Italy until today, so that there is no chance of it getting here in time. As Hewlett has all three of his cars at Elgin now there seems to be no doubt as to his coming to terms with the two-time winner of the American Grand Prix.

Course Preparations

Work on the course is progressing rapidly and unless it rains the rest of the week, which is unlikely, it will be in shape by Saturday. Practice, however, will not start until Monday. Several of the camps already have been established, the Fiat, Mercer and Mason being here already.

Wm. K. Vanderbilt, Jr.'s personal representative, E. G. Williams, inspected the course being prepared for the four big motor classics to be run under auspices of the Milwaukee Automobile Dealers' Association on September 17, 20 and 21, and returned to New York on last Saturday full of enthusiasm and highly gratified over the selection of the roads and the progress of the work of reconstruction.

"It is fine," was the expression of Mr. Williams after being hauled over the 8.2 mile course. "It is much better than the Greenfield course you Milwaukeeans first thought of using for the big races. Those two 3-mile straightaways will add a touch of the real sport of motor racing, and I think some new marks will be hung up if the course proves as fast as it looks today. One of the best features of the roads you have selected is that high speed can be maintained throughout its length, for your turns are wider than the rule and of such shape and dimensions that drivers will not have to slow down to the extent that they do on less safer turns on other courses."

The work of surfacing the roads with a 70 per cent. asphaltum composition, with screenings, began on Monday morning. A. B. Chamberlain, of New York, who has the contract for oiling the course, arrived on Saturday and has already organized his crews. The first oil has been applied on the Town Line road, the upper or north leg of the course, but the bulk of the work will await a thorough drying of the surface, following heavy and continuous rains.

Rain Hindered Road Work

During last week there were showers on all but 1 day, and this has interfered slightly with the progress of the road work. However, before the contract was taken, allowances were made for exactly such conditions, and the completion of the work will not be delayed 1 day unless some serious situation should arise which cannot be discerned at this time. One week from Saturday the course will be ready for the space-eaters. The drivers already entered for Milwaukee who will be seen at Elgin, will beat it from the Illinois course to Milwaukee and find the course ready for preliminary practice when they arrive.

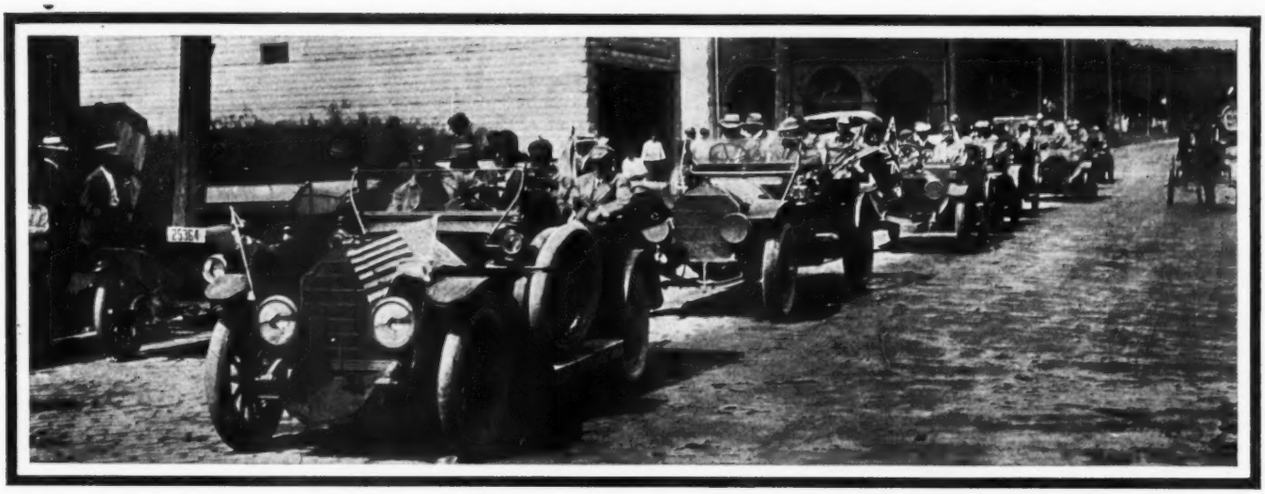
It is likely that no definite idea of how many cars and drivers will run in the four events at Milwaukee until the Monday following the Elgin meet. It is known, however, that sixty cars have already been nominated, meaning that each field will average fifteen cars. The light car classes, the Pabst Blue Ribbon and Wisconsin Challenge trophy events, are being well filled, the extra large cash purses and the beautiful cups being an inducement.

Fall Races for San Antonio

SAN ANTONIO, TEX., Aug. 19—At a recent meeting of the board of directors of the chamber of commerce of this city it was decided that an automobile race meet shall be held here October 24, 26, 27, as a feature of the annual Harvest Jubilee. Prizes aggregating $3,000 will be offered. Dr. W. A. Hering, of the San Antonio Automobile Club, was selected chairman of the committee which will look after the matter of arranging for the proposed races. Extensive repairs and improvements will be made to the local track and everything possible will be done to insure the success of the event.

GREENVILLE, MISS., Aug. 20—Heavy rains contributed to the failure of the Memphis Auto Trade Association's endurance test. Of the twenty cars that entered only five reached Greenville, the others returning after the heavy rains began. Two Cadillacs, an Overland, a Studebaker-Flanders and a Hudson pulled through the mud to this city. The Overland was damaged by going through a bridge, but despite the serious damage, repairs were made by the driver at the site of the accident.

ST. LOUIS, MO., July 8—The Automobile Club of St. Louis will soon have all preparations made for the annual reliability run of the organization, which this year is to take place in September. The exact dates have not been settled upon as yet. The route will very likely be to Glasgow, in the center of the state *via* the Cross-State Highway and back by a different route. This has not been decided definitely either.



Fourth annual tour of the Minnesota State Automobile Association entering the city of Minneapolis on the return from Winnipeg, Man.

Marmon Wins Badger

Is Now Permanent Holder of the Journal Trophy—Eight Cars Running at Close of Event

Records of the Runabouts So Close That Decision Is Left to the National Contest Board

MINNEAPOLIS, MINN., Aug. 16—With the Marmon entry, No. 1, victor in the touring car class and winner permanently of the Journal trophy, the fourth annual tour of the Minnesota State Automobile Association, its first international tour and most eventful run of its history, ended Thursday noon.

Eight cars remained in the running at the close. The Cutting and MacFarlan did not appear at the start, the Staver withdrew at the end of the second day and continued as official car. The pilot, pacemaker and press car stayed through. One of the non-contestant cars, that of President H. J. Clark, was abandoned in the mud at the end of the first half of the third day's run. The other non-contestant, Dr. H. G. Blanchard, of Waseca, Minn, ran through, although breaking three springs and an axle and having some tire trouble.

Owing to the closeness of the records of the Hupmobile and the Studebaker car driven by W. H. Soules, the decision as to the award of the *Daily News* trophy for the runabout class has been left to the national contest board. The unofficial points are twenty-two for the Hupmobile and twenty-one for the Flanders.

SCORE OF CARS FINISHING MINNESOTA TOUR

DAY. No. Name.	1	2	3	4	5	6	7	Total
1—Marmon	0	0	0	0	0	0	0—	0
*2—Hupmobile	5	0	7	0	3	4	3—	22
*3—Studebaker	9	0	0	12	0	0	0—	21
5—Cadillac	0	0	35	148	272	0	0—	455
7—Mitchell	0	0	3	0	0	191	3—	197
8—Paige-Detroit	9	21	114	65	12	23	0—	244
9—War.-Detroit	0	0	15	276	27	2	0—	320
11—Reo	0	37	3	7	3	15	0—	65

*Scores unofficial, have been referred to National Contest Board for decision.

The second half of the 7-day run was much easier on cars and drivers than the up-trip. A large part of the distance in North Dakota was over the Meridian road, which is in fair condition. The route from Winnipeg to the border at Emerson was on the east side of the river and far superior to the north-bound road, which was one of the worst found in the first three days of the endurance run. At Emerson a short trip was made west to Pembina, where the cars were cleared at the United States customs house.

While it was discovered that the north route through the middle part of the state and the White Earth reservation is not yet ready for persons who want easy touring, a perfectly feasible road was discovered returning to Minneapolis. A great part of the road is posted, the whole length of the Meridian road having two signs at each corner and slow signs on bad turns. This made the work easy for the pilot as well as the pacemaker. At intervals, a short cut had been made by the pathfinder, usually along the right of way of a railroad, which always resulted in a disagreeable run, owing to the recent rains in the district. Most of the mire holes encountered were on these detour roads, owing to the fact that the railroad, being high, acts as a dike and causes the water to stand on the gumbo soil.

Wilkin County Has Best Roads

The first dust encountered was in the sandy soil the last day as the route neared Minneapolis. Fine roads exist in the vicinity of Fergus Falls and Alexandria, favorite touring spots. Wilkin county, however, between McCauleyville and Breckenridge and between Breckenridge and Foxhome appears to have the lead for the Automobile Club of Minneapolis good roads bronze statue, hitherto in possession of Renville county, won in 1910. The reason for the award will be that the roads are consistently smooth and with good connections at culverts and bridges. Absence of chuck holes also moved the chairman of tht good roads committee, Louis Koch, to decide for Wilkin. Douglas county, in the famous park region of the state, has excellent and well dragged roads, but the occasional chuck holes worked in favor of Wilkin.

The return route from Winnipeg, being the older one, is more traveled than the western road. The scenery on the return trip is perhaps more beautiful, yet to the tourist the eastern route through the Indian reservation, who likes wild and untouched nature will appeal strongly. It transpired on the trip that the offer of the club trophy had resulted in much road work by the traversed counties and in an advance in road making methods due to the publicity of standard road building rules.

Automobile dealers on the tour were encouraged to believe there is to be a good market in their line for the 1912-1913 season, owing to the tremendous crops already harvested and being

threshed, and to the interest taken at all controls in the merits of the various cars entered.

Two cars went through without mechanical trouble, the Marmon with perfect score, the Cadillac used cars with many penalties, but mainly for broken spring work.

The developments of the tour as to the stability of the various cars are found in the accompanying table.

The tire record shows as follows: No. 1, four Goodrich tires, no trouble; No. 2, Goodyear tires, two blow-outs, nine punctures, all rear tires; No. 3, Studebaker, two Firestone in front, two Morgan & Wright in rear, three inners in front tires; No. 5, two Millers in rear, two blow-outs, one Goodyear and one Hartford front, no trouble; No. 7, same Kelly Racine used on pathfinder trip, all blew out, altogether three blow-outs and eight punctures; No. 8, Kelly Racine, one puncture, one blow-out; No. 9, Kelly Racine, one blow-out, two rear punctures; No. 11, Goodyear, six punctures, three blow-outs; No. 12, Goodyear (old), one puncture and one blow-out, came in on Michelins; Brictson press car, Pierce-Arrow, four Goodrich tires covered with Brictson treads, same air as in the 1911 Glidden, no trouble. Paige pilot, Kelly Racine tires, no changes; pacemaker, Stoddard-Knight, Hartford and one Goodrich, two blow-outs and four punctures.

Dallas to Have a Speedway

DALLAS, TEX., Aug. 19—Ed. A. Vaughan, a prominent local business man, is promoting the construction of a motor speedway to cost $250,000. The corporation, which will be known as the Dallas Motor Speedway Company, is well advanced toward organization. It is the purpose of the company to construct a 2-mile speedway on the Miller farm in Oak Cliff, a suburb of Dallas. The plans and specifications for the course, grandstand and other features of the enterprise have been prepared. The grandstand will have a capacity of 20,000 people and in addition to this there will be bleachers with a seating capacity of 10,000 people. The entire race course will be in view from the grandstand and bleachers at one time. The site for the proposed speedway is ideal. Mr. Vaughan says it is intended to have the speedway finished and ready for formal opening next May during the monster meeting of the Shriners.

200-Mile Sunday Race at Columbus

COLUMBUS, O., Aug. 19—Entries are coming in satisfactorily for the 200-mile automobile race to be run off on Sunday, Aug. 25, at the Columbus Driving Park under the auspices of the Columbus Automobile Club. Assurances are given that there will be at least ten entries and possibly more. Among the number will be several Cino cars, a Columbus Firestone and others.

The committee in charge of the event will make every effort to keep the dust down upon the track and to that end have purchased 15 tons of calcium chloride which will be spread upon the track before the race is started.

Burman Stars at Albany

Breaks New York State Record for Mile on Two-Lap Track, Covering the Distance in 1:12 4-5

Retains the Remy Brassard and the W. B. Trophy Besides Winning $50 Cash Prize

ALBANY, N. Y., Aug. 19—At the first official automobile meet ever held in Albany, Bob Burman in his Blitzen Benz car raced 1 mile in 1:12 4-5 on the two-lap track at Parr's Island here Saturday afternoon before 5,000 spectators, clipping 4 1-5 seconds from the previous record for a mile in New York State on a two-lap track, the previous record having been made at Binghamton 2 years ago. Burman was victor in five out of seven events, the first event being only for Albany drivers of high-powered cars and the final race being a non-stock, special event, free-for-all handicap, in which Burman, in Cutting, was defeated handily by Harry Kyle, driving his White car. However, Burman retained the Remy Brassard and W. B. Trophy, each valued at $2,500, winning two of three heats for Remy Brassard and easily beating Harry Kyle in fifth event for the W. B. Trophy. In addition, Burman captured a $50 cash prize by beating H. Kyle, in his White, in the third event, making 3 miles in 4:9 3-8. Summaries:

3-MILE RACE FOR ALBANY DRIVERS

Driver	Car	
Dodds	Stutz	5:40
Earle	Jackson	
Cannon	Cole	

1-MILE DASH FOR RECORD

Burman	Blitzen Benz	1:12 4/5

3-MILE RACE

Burman	Cutting	4:09 3/5
Kyle	White	

3-MILE RACE FOR NON-STOCK CARS

Burman	Ohio	4:20
Kyle	White	
Nickman	Mercedes	
Grennon	Benz	

3-MILE RACE FOR NON-STOCK CARS

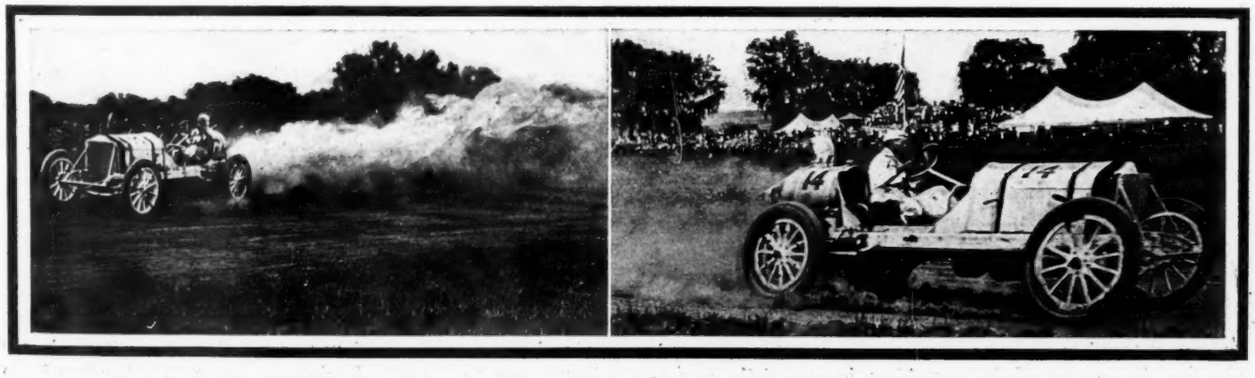
Burman	Cutting	4:07 2/5
Kyle	White	

3-MILE RACE FOR NON-STOCK CARS

Burman	Ohio	4:18 3/5
Hickman	Mercedes	
Kyle	White	
Grennon	Benz	

3-MILE, NON-STOCK, FREE-FOR-ALL

Kyle	White	4:45 2/5
Burman	Cutting	
Hickman	Mercedes	



Harry Kyle, who defeated Burman in the 3-mile, non-stock, free-for-all, kicking up the dust on the backstretch

News From Foreign Lands

Argentine Is a Great Automobile Country —Switzerland Prejudiced—New Dutch Substitute for Rubber

Motor-Driven Agricultural Implements of All Sorts Receiving Much Attention in France

BUENOS AIRES, ARGENTINA, Aug. 16—The Argentine Republic is keeping pace with other nations in her interest in and adaptation and use of the motor car. Buenos Aires is the center of activity in the rapidly-growing practice of making use of the motor vehicle in all of the phases of traffic where the automobile agreeably fits in—private pleasure cars, public conveyances, especially taxis, char-a-bancs to carry twenty passengers, post-office vans, commercial trucks, fire engines and accompanying apparatus, military and hospital ambulances, and the doctor's runabout.

Years before the motor vehicle was brought into use the public officials had seen to it that not alone the streets of Buenos Aires, but of the rural districts in general, were put into a travelable condition. The force of this statement must be apparent when it is known that there are 7,290,862.79 square meters of pavement in Buenos Aires alone. From these figures it will be seen that practically every street in the city is paved. So far as the country roads are concerned, their upkeep involves the latest methods, the steam roller and crushed stone entering conspicuously into the building of the public thoroughfares.

All motor-driven vehicles used in the republic are licensed in Buenos Aires, the rates for licenses varying from what in United States money equals $11 to $41 yearly. Every driver of a public taxi is required to carry a notebook containing a photograph of himself, together with traffic regulations affixed to its pages. The speed limit within all cities is 10 miles per hour. The law compels every owner or driver of a hackney carriage or taxi used for public service to be open, after the victoria pattern vehicle, this demand being made on the ground of hygienic necessities. Garages are not only numerous, but splendidly equipped and equal in efficiency to the best in any other part of the world.

The police, especially the mounted contingency, have supreme control in regulating street traffic.

All motor vehicles entering Argentina are required to pay a customs duty of 10 per cent. of value.

Of the 47,617 vehicles of all sorts in Buenos Aires 2,601 comprise private automobiles of all the best makes, the United States being well represented, 1,005 taxicabs and 140 motor trucks. Then there are the fire-engines and motor vehicles in other branches of public service. Of course, the automobiles in use in other sections of the republic bring the total number up much higher than indicated by the figures above. The people of that country demand the very best grade of automobiles and there is no other nation in which the possibilities of trade in high-class cars is greater. The cars must be demonstrated to their entire satisfaction. Besides, as is the case in other Latin countries, there are certain practices of credit to be observed. Custom has demanded it for generations, and it is the manufacturer who honors and pays heed to this rule who gets the business in Argentina. Another indispensable necessity is the practice of keeping a complete set of repair parts.

Down to the present time there is no factory in Argentina where the automobile is produced in its entirety. There are, however, quite a number of assembling plants, where imported parts are put together.

The fire department of Buenos Aires is essentially motor-supplied. The brigade is governed with military discipline and is dependent on the central police brigade and the minister of the interior. The brigade is 1,000 strong, having a complete complement of officers corresponding to a line regiment, with a colonel in command. A fully equipped station, involving motor fire-engines and every modern improvement, is installed in each police division. The cost of upkeep of the city fire brigade is $4,000,000 in Argentina (paper) money, equivalent to $1,760,000 of United States money, yearly. There is a similar automobile fire brigade, but smaller, maintained in each province of the republic.

In no other country in the world has the introduction of the automobile produced a greater revolution in traffic than in this aggressively modern Republic of Argentine.

Switzerland Still Unprogressive

Switzerland's heart is still in the wrong place, so far as its attitude toward motorists and motor cars is concerned. The car of the tourist is excluded from the most picturesque and romantic Cantons, even such as the Canton of Schwyz. Nor may the car traverse the glorious Grisons; nor over the lovely road from Landquart to Chur; the St. Gothard and Simplon passes; the lofty valley of the Engadine; the vicinity of the Maloja Lakes; the magnificent Axenstrasse high above the superlative Lake of Lucerne; St. Moritz; Davos; Pontresina; nor the Bernina, Maloja or Splügen passes. Not even the combined efforts of the Federal Government and the Swiss Automobile Club can succeed in overcoming the obstinacy of the Swiss people. And all because they declare that the dust kicked up by motor cars running over the roads would float over the fields, settle upon the grass and thus upset the digestive powers of the cattle. Evidently the Swiss are a people who do not hold that every cow is doomed to eat the conventional peck of dust during the period of her lifetime.

Rubber Substitute in Holland

A factory is under construction at Ymuiden, Holland, it is reported, where a rubber substitute invented by a Mr. Van der Heyden will be manufactured. The ingredients to be used are fresh fish meat and 15 per cent. of natural rubber which are mixed and treated by a secret process. Besides having all the desirable properties of natural rubber the new product is said to be insensible to the action of heat and benzine. It is also very cheap, as albumen is gained as a by-product and the wastes may be used for fertilizing purposes.

Motorizing Dublin's Fire Brigade

Captain Purcell, chief officer of the Dublin Fire Brigade, has set out on a mission of economy, by means of which he hopes to revolutionize the fire-fighting system of the United Kingdom. His plans fall nothing short of motorizing every brigade, and at the same time preventing the present existing patterns of horse-drawn fire engines from being consigned to the scrap-pile. Captain Purcell's scheme is to strip off the pole and whiffletrees from the engine and attach a motor tractor in place of horses.

Not alone are some of the Dublin engines already undergoing this stage of evolution, but the brigade is being supplied with four-cylinder, 50-horsepower engines of the internal combustion type, having dual ignition, and forced lubrication to all bearings. The transit gear is stopped on arriving at a fire, and a lever is moved by means of which the pump is coupled up to and driven by the same engine. This pump is of the centrifugal pattern, manufactured in gun-metal, and, when connected up to the hydrants, considerably augments the pressure available in the water mains. In order to create an instantaneous vacuum, a special air pump is provided, when it is found necessary to lift water by suction from an open reservoir. The capacity of this pump, while making its normal speed of 1,750 revolutions per minute, is 350 gallons every 69 seconds, forcing the water to a height of 300

feet, while maintaining a pressure on the hose delivery of 120 pounds to the square inch. At a lower pressure it will deliver even a greater quantity.

Each engine has accommodations for carrying ten men, in addition to .26 gallon of fuel in lockers—tools, standpipes, smaller appliances, 2,000 feet of delivery hose, and 32 feet of 5-inch suction hose. The method of steering the motor comprises an apparatus by which the front wheels pivot in the center of the hubs, thus relieving the gear from shocks and transmitting them to the axle direct. The tires, broad and flat, are of the solid rubber sectional block type, built to encounter snow or soft ground with no danger of skidding.

Not alone is Dublin's fire brigade equipped with the new motor fire engines, but many of the suburban towns, like Ball's Bridge, Blackrock and Kingstown are provided with up-to-date motor fire-fighting apparatus.

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Automobiles in Yucatan

According to tax records, there are today 103 licensed private automobiles in Merida, 6 of which are electric. Commercial vehicles have not been introduced, and it is not likely that they would find ready acceptance, in view of the cheaper mode of transportation by cart. The most popular types of car are the 5-passenger touring car and the runabout, of 20 to 30-horsepower, four cylinders, and a gear ratio of 3.5 or 4.2 to 1. No particular attention seems to be paid to the finish. A chauffeur's license costs 75 cents and an automobile license for any size car costs $5 monthly. There are four garages in Merida, but they do not carry on hand a large supply of repair parts. The local market seems to have been well looked after, but it is probable that there will be further opportunity for sales when conditions improve. American cars have given good satisfaction, as is shown by the fact that in the last 3 years importations of automobiles from the United States amounted to $43,990, as compared with $19,002 from France.

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French Agricultural Motor Tests

WASHINGTON, D. C., Aug. 19—Bartley F. Yost, consular assistant at Paris, reports to his department that the subject of motor power for agricultural implements is receiving more and more attention in France. The third annual contest of the Automobile Club of France, in which prizes are offered to farmers having attained the greatest success in the use of motors, will be opened this year in a dozen different departments. Farmers who wish to take part in these contests, according to Mr. Yost, are required to furnish information as to the area of their tillable soil, nature of crops produced, number and kinds of animals used in their work, designation and origin of motors used in their work, name of the manufacturer of the motor, nature of combustible used, force in horsepower, kinds of implements and machinery propelled, date of installation of motor, and results obtained.

American concerns interested in the results of these tests should apply to the president de la Commission agricole de l'Automobile Club de France, 8 Place de la Concorde, Paris.

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American Automobiles in Ceylon

WASHINGTON, D. C., Aug. 19—Charles K. Moser, United States consul to Colombo, in reporting on the trade and industries of Ceylon, says, under the heading, "Automobile Trade-Gasoline Imports:"

"During 1910-11 193 motor cars were imported, of which 9 came from the United States. During the last six months of 1911, 118 motor cars were imported, of which the share of the United States, according to the official figures, was 17. Probably half as many more cars of American make were brought into the island from other countries. It is expected that during 1912 from 100 to 150 motor cars will be imported, and there is a good market here for American cars that can carry out catalogue promises. The great complaint one hears against American motor cars is that they are lightly and carelessly built and that they do not stand up.

"The steady increase in the market for motor cars is reflected in the imports of gasoline. In 1909, 66,203 gallons were imported; in 1910, 136,646 gallons; in 1911, 206,028 gallons, valued at $83,533. Of this amount only 800 gallons were American gasoline, and yet American gasoline is admittedly far superior to Borneo gasoline and is sold to local consumers at from $0.06 to $0.10 per gallon cheaper. A local dealer gives two reasons for this: The prejudice which exists in this community against most American products, and the fact that the Borneo gasoline was first in the market and is now sold to wholesalers and consumers under a contract by which they are bound not to use any other."

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GLASGOW has done away with every horse-drawn fire-engine in the city, with a single exception. Her fire brigade is now equipped with sixteen motor fire vehicles. The last instalment comprised eight turbine pumps and one motor car.

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FRANCE now has in use 85,000 motor cars, her last year's production having been 40,000; Germany, in use, 50,000; production, 15,000; Italy, in use, 15,000; production, 5,000.

Calendar of Coming Events

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What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

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American and Foreign Fixtures of Importance Set Down in Chronological Order

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Shows, Conventions, Etc.

Aug. 24-Sept. 9	Toronto, Can., Display of Automobiles, etc., at Canadian National Exhibition, Transportation Building.
Sept. 5-15	San Jose, Cal., Automobile Show, San Jose Automobile Dealers' Association.
Sept. 14-21	Chicago, Ill., Annual Fall Festival and Show, Chicago Automobile Trade Association.
Sept. 17-20	Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3	New York City, Rubber Show, Grand Central Palace.
Dec. 7-22	Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11	Cleveland, O., Annual Automobile Show.
Jan. 11-25, 1913	New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25	Philadelphia, Pa., Annual Automobile Show.
Jan. 27-Feb. 1	Detroit, Mich., Annual Automobile Show.
Feb. 1-8	Chicago, Ill., Annual Automobile Show.
Feb. 10-15	Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22	Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1	St. Louis, Mo., Annual Automobile Show.
March 3-8	Pittsburgh, Pa., Annual Automobile Show.
March 8-15	Boston, Mass., Annual Automobile Show.
March 17-22	Buffalo, N. Y., Annual Automobile Show.
March 19-23	Boston, Mass., Annual Truck Show.
March 24-29	Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Aug. 30-31	Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 1-2	St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. 2	Indianapolis, Ind., Speedway Meet.
Sept. 2	Winnipeg, Man., Track Meet.
Sept. 3-6	Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. 11-14	Buffalo, N. Y., Third Annual Reliability Tour, Automobile Club of Buffalo.
Sept. 17	Milwaukee, Wis., Grand Prize Race.
Sept. 20	Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21	Milwaukee, Wis., Vanderbilt Cup Race.
Sept.	Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-11	Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12	Salem, N. H., Track Meet, Rockingham Park.
Nov. 6	Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign.

Sept. 26-Oct. 6	Bourges, France, Agricultural Motor Car Exposition.
Nov. 8-16	London, England, Olympia Automobile Show.
Jan. 11-22	Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.

The Automobile

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The Designing Program

THERE are some cars that are designated one-engineer machines; there are others that are engineering-corps machines; these two classes of cars are very different products.

The first class is the outcome of the brains of one man, together with whatever good he abstracts from the products of other makers. If he is not too individually obstinate, to avail himself of such opportunities.

The second class is the product of several engineers, some of whom may be chief engineers and the others engineers who have been called into consultation on different points that arise in conjunction with the bearing problems of the machine, the ignition problems, the self-starter questions, carburetion, axle design and the many other departments that call for special engineering knowledge.

History reveals in the short span of American automobile history many examples of the one-engineer machine and there is a common factor in nearly all, namely, that the course has been an expensive one to the maker and is generally a course that has had to be reformed because of financial exigencies. The one-engineer car is really almost impossible to conceive, particularly when that engineer looks upon himself as a magneto expert, an efficiency factor in the carbureter problems, a quantity to be reckoned with in bearings and their manufacture, the last word in suspension, the Alpha and Omega in gearbox design as well as the oracle of a score of other departments of engineering in automobile manufacture.

The last 10 years of automobile history show how expensive the one-engineer principle has been to a few makers, where the one man was responsible for everything from the rear axle to a new lubrication system for the motor, at the same time serving as factory superintendent and advisory head for every department in the factory. A new model brought out under such individual pressure is launched on the stormy seas of its career and scarcely has it cleared the harbor than the rocks have grated on the keel. The rear axle has developed a noisy differential, it has developed a weak bearing, it has developed weak studs in the differential, it has developed an oil leak which eventually reaches the brakes and it has developed not a few other structural weaknesses.

The gearbox of this one-engineer car has shown similar defects and the cost of correcting them after the model has been launched becomes enormous. It may be that the clutch brake has not had adequate adjustment provisions; accessibility has been unnecessarily sacrificed between the motor and gearbox, the brakes have not been increased commensurately with higher motor power due to larger valves, lighter reciprocating masses or improved ignition. The one engineer could not do it all. The final result has been expense from first to last, expense coupled with a reduced reputation, expense coupled with overworked maintenance departments and expense coupled with a club placed in the hands of every rival maker.

With an engineering-corps organization such troubles are largely eliminated, they being met face to face in the early evolution of the design and corrected before placed on the 1913 market. One of the best-known American automobile engineers was quite free recently in telling about the different consulting engineers whom he engaged to wrestle with him in the problems of his new model. He engaged the best to eliminate the bearing noises in the gearbox; he engaged others to work out the weaknesses of the self-starting outfit; he engaged others to solve the problem of proper motor size with reference to car weight and speed; he engaged a transmission expert to aid in the selection of gear ratios between motor and rear wheels for the different speeds; he engaged others who were expert in body work, with the hope of reducing body squeaks to the minimum; and this engaging of or consulting with experts could be described still further, but sufficient examples have been cited to show the wisdom of the engineering-corps cars as well as to indicate how it is economy to develop a new model along such broad-gauge lines.

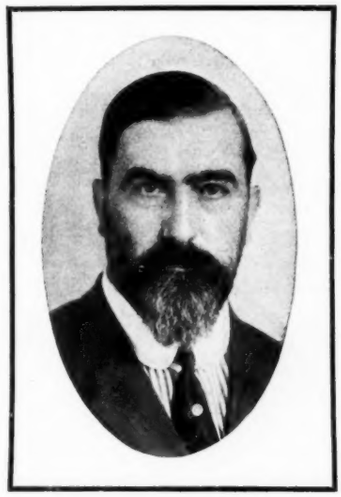
A company bringing out a car under the engineering-corps system is assured of the kinks being eliminated before the model has been passed upon; it is assured that the whims of individual engineers will not find a place in the car total without having been laid threadbare before the other engineers who were called into consultation or were on the regular engineering staff. It is assured that some discarded feature of design will not be continued because one engineer desires that it should be so; it will be assured that some valuable new factor will not be left off the design because one engineer had some whim against its adoption; in a word, the car will be an engineering construction and not a composition of the whims of one man. The car will be a rational unit rather than a motor with entirely unsuited chassis parts, or as

it has been in some cases a new type of carbureter with the remainder of the car subservient to this one part. The business factory must insist on the engineering-corps method of production. It is the only safe one, it is the only one that will keep abreast of the times and produce for the company that share of the industry's profits which its organization merits. The manufacturer who, led by a false sense of economy, tries to make larger profits by conducting his works on a one-man basis, is bound to court failure in the long run if he keep up his policy, and a big loss even if he drops it after having at length learned his lesson. Competition is growing keener every day, and the sooner he will see his way to fall in line with the trend, the surer will be his success.

Henry F. Donaldson, S. A. E. President, Dead

Had Been An Important Figure in the Automobile Industry for Over a Decade—After Wide Experience in Journalistic Work, He Became Prominent in the Motor Publication Field—For Several Years Editor of "THE AUTOMOBILE"

HENRY F. DONALDSON, president of the Society of Automobile Engineers, died suddenly at his home, 508 West One Hundred and Forty-ninth street, New York, on Tuesday, August 13. Mr. Donaldson had been an important figure in the automobile industry for 10 years and his sudden death came as a shock and a sorrow to his multitude of friends and business and personal associates.



Henry F. Donaldson

Mr. Donaldson's progress in the industry was rapid and steady and he was at the summit when death's summons reached him. He was a man of broad sympathies and warm-blooded friendships. As a star reporter 20 years ago it was not below his dignity to extend a helping hand to the struggling cubs and for that reason, among others, his name is held in respect throughout that mysterious realm known as the Fourth Estate.

As an engineer he was well founded by careful preparation at one of the great Glasgow universities where he took the classical course as well as that in marine engineering and was an honor man in his class. As a writer and editor, he graduated from the mill of metropolitan journalism and carried his wide knowledge of technique into his automobile work.

He was of Scotch-Irish descent, like many thousands of others who have made their mark in journalism. His first work was in a Glasgow shipyard, where he rose to a position of authority in a short time. Despite his powerful physique of late years, he was a delicate youth and the exposure and irregularity of his work in Glasgow undermined his physical stamina, causing him to seek health in the United States. About 1888 he worked as a reporter in Chicago and when the Chicago *Times* was reorganized he was employed on the local staff, handling many of the leading stories. Later he worked on other Chicago newspapers and eventually heard the call to New York. His daily work in the metropolis was largely on the New York *Times*, where he was employed until about 1895. He was one of the founders and chief editor of *Marine Engineering*, the leading marine engineering publication of the world. About 1900 he sold his interest in the paper to his partner and in 1902 was appointed editor of THE AUTOMOBILE.

After being engaged for that work, Mr. Donaldson was sent on an extensive foreign and American tour to inspect the status of the industry, assuming the editorial chair in the fall. He continued as editor of THE AUTOMOBILE for several years. He was one of the pioneers to recognize the tremendous importance of the automobile truck as a factor in commercial life and was one of the founders of the *Commercial Vehicle*.

When the reorganization took place last year, Mr. Donaldson sold his interest in the publication and went into partnership with Joseph Tracy as consulting automobile engineer.

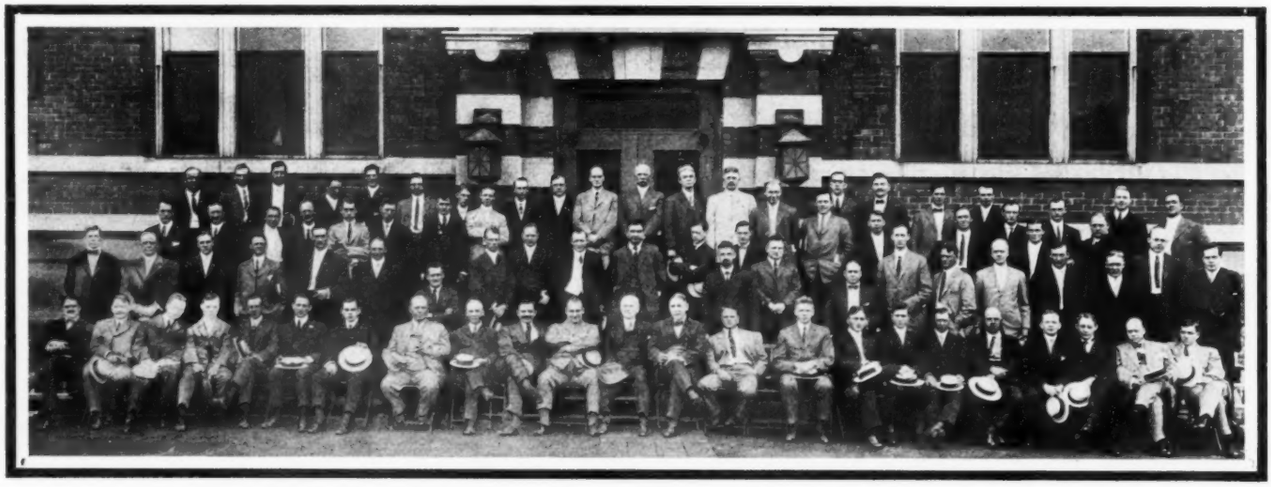
He had always been interested in the organization work of the Society of Automobile Engineers and assisted in every way possible. The work was recognized by the society and Mr. Donaldson was honored by election as its president last January. He was a leading spirit in getting up the European trip of the society last fall and aided in making that trip a big success. He was largely accountable for the recent summer excursion of the society, when the sessions of the organization were held on board a lake steamship, which proceeded from Detroit to the head of Lake Huron and return.

Mr. Donaldson was 45 years old. He leaves a widow, but no children.

The Council of the Society of Automobile Engineers has passed the following resolution on the death of President Henry F. Donaldson:

RESOLVED, that the Society of Automobile Engineers, through its Council, greatly deplores the death of its President, Mr. Henry F. Donaldson, whose capable and energetic work for the Society during the past year is widely recognized and who was respected and beloved by all of his associates for those brilliant attainments of mind and sterling qualities of manhood that raised him above the ordinary level of mankind, making him a natural leader and an unwavering advocate of that which was right and noble and generous; and be it further

RESOLVED, that the Society extends its deepest sympathy to his immediate family and other relatives in their grief over their great and irreparable loss.



Annual convention of Mitchell distributors at the Mitchell-Lewis factory, Racine, Wis., where they inspected the 1913 models

DETROIT Demountable's Yearly Meeting—The Detroit Demountable Rim Company held its annual meeting at Detroit, Mich., last week, when new officers were elected. The company has been manufacturing rims for but one year and has sold about 100,000 sets of various types of rims.

Buick Ships 1913 Models—The Buick Motor Company, Flint, Mich., has made its first shipment of assembled cars of the 1913 model. A carload went to San Francisco, the first city to receive next year's line of cars. Shipments will be made from day to day to the agencies farthest from Flint in order that the distant points may be served at the same time as the closer ones. To-day 3,000 men are on the payroll, the production is 90 days ahead of last year and the shipments are 60 days ahead of time.

Cole Representatives Confer—Cole representatives from all parts of the globe spent a day recently familiarizing themselves with the Cole product at the plant, Indianapolis, Ind.

Rowan Joins Clark-Carter—F. S. Rowan has assumed the position of advertising manager of the Clark-Carter Automobile Company, Jackson, Mich., manufacturer of Cutting cars.

Eisemann's Factory Sales Branch—The Eisemann Magneto Company has opened a factory sales branch in Indianapolis, Ind. The branch has a complete repair shop and service station.

Ward with American—J. M. Ward, secretary of the Indiana Automobile Manufacturers' Association, has been appointed assistant sales manager of the American Motor Company, Indianapolis, Ind.

Callan to Explain Law—Hon. Albert S. Callan, author of the present New York State automobile law, is to speak at the West Side Y. M. C. A. August 29; at 8.15 p. m., on the New York State Automobile Law.

Add Supply Department—The New York Coach and Auto Lamp Company, New York City, manufacturer of automobile lamps, has added an automobile supply department to do wholesale jobbing in accessories of all kinds.

India's Pioneer Automobile Man—Kavashah D. Wadia of Bombay, India, is in America for a week's stay. He is the pioneer automobile man of India. While here he will probably take up the matter of introducing more American cars in India. He will stop at the Prince George, New York City.

Moore with Gramm-Bernstein—W. H. Moore has given up his position as sales manager of the Gramm Motor Truck Company, Lima, O., to take the position of general sales manager of the Gramm-Bernstein Company, of that city.

Adds Automobile Supply Department—The New York Coach & Automobile Lamp Company, New York City, has added an automobile supply department where wholesale jobbing will be done in automobile accessories of all kinds.

Kraatz with Beaver Company—F. O. Kraatz has been employed by the Beaver Manufacturing Company, Milwaukee, Wis., to act as outside man for the purchasing department. He will assist in securing prompt shipments of raw materials.

Indianapolis Company Opens Salesroom—The Indianapolis Motor Car Company, Indianapolis, Ind., has opened a new salesroom where it will handle the Flanders electric and Everitt. It will continue the truck salesroom and garage as heretofore.

Fosdick with Hupp Company—An important addition to the forces of the Hupp Motor Car Company is announced in the appointment of Harry Fosdick as assistant general manager with particular reference to the supervising of agencies and sales distribution.

Splitdorf Service Station Complete—After September 1 the premises at 18-20 West Sixty-third street, New York City, will be the New York headquarters for the whole line of Spiltdorf ignition devices. Oscar J. Rohde will be in charge of the new Splitdorf headquarters.

Makes 90 Miles Speed Limit—The old town of Westmoreland, near Huntington, W. Va., has made a revolutionary step and fixed the speed limits within its borders at 90 miles an hour, as is announced on huge signboards. The reason for this ordinance is that lower speed limits are apt to be ignored.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Boston, Mass.	Abbott-Detroit	Frederick A. Dutton
Boston, Mass.	Krit	Dayton G. True
Baltimore, Md.	Marmon	Walter Scott
Battle Creek, Mich.	Franklin	American Motor Co.
Boswell, Ind.	R-C-H	Levi S. Orr
Casper, Wyo.	Cole	Casper Machine & Garage Co.
Charleston, S. C.	Cole	King Auto & Repair Co.
Cheyenne, Wyo.	Cole	Boyle & Joffee
Conrad, Mont.	Chalmers	C. H. Drake
Baltimore, Md.	Rambler	Chesapeake Garage Co.
Baltimore, Md.	Studebaker	Colonial Garage Co.
Buffalo, N. Y.	Hudson	Chas. E. Flory
Canton, Ill.	Henderson	Meade McClatchey
Chicago, Ill.	Henderson	J. G. Tennant & Co.
Dallas, Tex.	R-C-H	R. H. Davis & L. P. Turney
Davenport, Ia.	R-C-H	Knueppel & Ott
Decatur, Ill.	Henderson	F. D. Parker
Edmonton, Alb.	Henderson	Standard Motor Car Co.
Elizabeth, N. J.	R-C-H	Franklin Auto Co.
Elizabethtown, N. Y.	R-C-H	V. W. Prime
Enderlin, N. D.	R-C-H	B. N. Eagle
Fall River, Mass.	Henderson	F. W. Davis & Co.
Galveston, Tex.	Cole	John Christenson & Co.
Granville, N. Y.	R-C-H	G. C. Walker
Hamilton, Mont.	Chalmers	W. H. Beck
Harvard, Ill.	R-C-H	W. F. Wittmus
Haverhill, Mass.	R-C-H	Samuel E. Cass
Independence, Kan.	R-C-H	J. A. Pinkston
Indianapolis, Ind.	Nyberg	Finch & Freeman
Landor, Wyo.	Cole	Cole & Co.
Beads, S. D.	Cole	Blodgett Brothers
Lewiston, Mont.	Chalmers	J. H. McCraskey
Louisville, Ky.	Stutz	Commercial Car Co.
Lowell, Mass.	R-C-H	City Hall Garage
Madison, Wis.	Chalmers	W. H. Hobbs Supply Co.
Madison, Wis.	Ford	Schoellkopf Co.
Madison, Wis.	Kisselkar	Spooner-McConnell Auto Co.
Madison, Wis.	R-C-H	Spooner-McConnell Auto Co.
Milwaukee, Wis.	Marion	W. E. Allen Co.
Milwaukee, Wis.	McFarlan	W. E. Allen Co.

PLEASURE CARS

Place	Car	Agent
Milwaukee, Wis.	Regal	Wagner & Johnson
New Brunswick, N. J.	R-C-H	New Brunswick Garage Co.
North Yakima, Wash.	Franklin	Franklin Auto Sales Co.
Norton, Mass.	R-C-H	A. W. Sibley
Oconto Falls, Wis.	Ford	Munsert-Carlson Co.
Paterson, N. J.	R-C-H	F. P. Venable
Philadelphia, Pa.	Warren-Detroit	Boulevard Garage & Sales Co.
Plattsburg, N. Y.	R-C-H	R. W. Squires
Plymouth, Pa.	Michigan	L. R. Koons & D. F. Hallier
Portland, Ore.	Buick	Buick Motor Car Co.
Portland, Ore.	National	Buick Motor Car Co.
Red Lodge, Mont.	R-C-H	J. P. Plunkett
Ridgeville, Ind.	R-C-H	J. Carpenter
Rutland, Vt.	Cole	Coton-Brewster Co.
Seattle, Wash.	Detroiter	Olympic Motor Car Co.
Seattle, Wash.	Franklin	A. W. Wicks
Sheboygan, Wis.	Studebaker	Sheboygan Automobile & Supply Co.
Somerville, N. J.	R-C-H	Thomas Motor Car Co.
South Bend, Ind.	R-C-H	Johnson Beattie Auto Co.
Spokane, Wash.	Peerless	W. J. Healy.
Spokane, Wash.	Rauch & Lang	W. J. Healy
Springfield, Ill.	R-C-H	R. Haas Elec. & Mfg. Co.
Springfield, Mass.	Henderson	Forest Park Garage
Sullivan, Ind.	R-C-H	E. S. Crowder
Toledo, O.	Regal	Bowersox Motor Sales Co.
Twin Falls, Ida.	Franklin	Swim & Aldrich
Victoria, B. C.	Franklin	G. Harold Grant
Worcester, Mass.	Pope-Hartford	Coton-Brewster Co.
Zion City, Ill.	R-C-H	Duncan G. Bellows

ELECTRIC CARS

Buffalo, N. Y.	Hupp-Yeats	Louis G. Schoepflin
Louisville, Ky.	Standard	Dunham Auto Co.

COMMERCIAL VEHICLES

Dallas, Tex.	Lincoln	Fife & Miller
New York City	Lincoln	Rockwell Motor Transportation Co.

Sudrow Sales Manager Marion—F. G. W. Sudrow has been appointed sales manager for the Marion Motor Car Company.

Williams with Swinehart—The Swinehart Tire & Rubber Company has secured A. E. Williams as advertising manager. He was formerly with the Firestone Tire & Rubber Company.

Change in Pope Hartford Agency—The Pope Hartford Company has made a change in its agency at Worcester, Mass., giving it to C. D. Brewster, of Marlboro, and Eugene L. Caton, of Worcester.

Paige Goes to Boston—M. R. Paige, sales manager of the Moline Wagon Company, Moline, Ill., has gone to Boston, Mass., to join the Boston branch of the Velie, taking charge of the commercial department.

Goodyear Branch Moves—The Goodyear Tire & Rubber Company's branch has been removed from 1026 Connecticut avenue to 1016 Fourteenth street, Washington, D. C., where a three-story brick and stone building has been erected by the company.

Marathon Agency Expands—The Marathon Sales Company. Baltimore, Md., which handles the Marathon cars, has opened showrooms at 1117 Hunter alley. The service station will be continued at 10 Morton street.

Mitchell Service Building Enlarged—The Mitchell Automobile Company, Milwaukee, Wis., has reopened its service building and sales headquarters. Two stories have been added and the equipment of the plant doubled. N. R. New is manager at Milwaukee.

Guatemala Buys Cars—The Government of the Guatemalan republic recently bought four Cadillac automobiles for the use of its army. The cars, which are shown on this page, were equipped with a field piece each, and two of the four were also fitted with wireless equipment. Mr. Camacho instructed a number of soldiers in the operation of the cars, a class for this purpose being organized in the Guatemalan military academy. After 4 months' tuition, the soldiers proved efficient chauffeurs, although there are practically no roads outside of Guatemala City, the capital of the republic, where all the instruction was given.

Four Cadillac cars fitted with field guns purchased by the Government of the Republic of Guatemala for army use

Watrous pumping engine in use at Bridgeport, Conn.

Wishart to Drive Mercer—Spencer E. Wishart has been added to the Mercer racing team. He will drive a Mercer raceabout in the series of contests to be held in middle West.

Fitzsimons Leaves Thomas—George Fitzsimons has resigned his position as sales manager of the E. R. Thomas Motor Car Company, Buffalo, N. Y., to take effect September 1.

Change in Cole Agency—The firm of Setzer & Beach, Bridgeport, Conn., has been dissolved. The new organization, under the name of Bernard Setzer, will continue to handle the Cole.

Taylor with Philadelphia Garage—William T. Taylor, formerly local branch manager of the Warren, has been appointed sales manager of the Boulevard Garage & Sales Company, Philadelphia, Pa.

Stuart Joins Hatch Forces—Arthur J. Stuart, formerly connected with the Kissel Kar Company, has been appointed sales manager of the Mason B. Hatch Company, Main and Northampton streets, Buffalo, N. Y.

Potomac Company to Move—The Potomac Motor Car Company, Washington, D. C., has leased 1226 Connecticut avenue N. W. for a term of years, and after exclusive improvements will remove from its present quarters.

Baker Abandons Yearly Models—The Baker Motor Vehicle Company, Cleveland, O., has abandoned the idea of the yearly announcement of new models. That they have found it a better policy to simply give continuously to the purchaser the benefit of the best and latest improvements.

Buffalo Company Reorganizes—At a reorganization of the Positive Clutch & Pulley Company, Buffalo, N. Y., manufacturers of patented power transmission appliances, Ulysses L. Caudell was elected president; Thomas A. Chisholm, vice-president and Geoffrey T. Clarkson secretary-treasurer.

Leech Oakland Philadelphia Manager—Edward K. Leech will assume the management of the Philadelphia, Pa., branch of the Oakland Motor Company, Pontiac, Mich., to be established here September 1. Mr. Leech came from the *Commercial Car Journal*, Philadelphia, Pa., where he was general manager.

Ewing Resigns from Nyberg—Oscar R. Nyberg has resigned from the Nyberg automobile Works, Anderson, Ind., as head of the publicity and advertising department, to return east to complete his course in the Harvard Law School. C. A. Lawrence, city editor of the Anderson Morning Herald, will succeed him.

Philadelphia Trolley Company's Complaint—The Fairmount Park Transportation Company, Philadelphia, Pa., has lodged a complaint against the sightseeing automobiles, claiming that the use of the roads through the park for business is a violation of a rule of the commission barring business vehicles from the park drives.

Bridgeport Buys Pump Automobile—The city of Bridgeport, due to the demands of the Board of Fire Commissioners, has purchased a new $10,000 Watrous gasoline pumping engine. This will be stationed in the thickly populated section east of the Pequonnock. The engine is rated at 126 horsepower and is capable of driving the machine at a speed of 40 miles an hour.

North Shore Express Line—The People's Express Company, operating a fleet of motor trucks along the North Shore of Massachusetts from Boston to Newburyport and Amesbury, has found the business so profitable that an order has just been placed with the Myer Abrams Company of Boston for three 3-ton and one heavy-duty 5-ton Lauth-Juergens vehicles for additional service.

May Have Bus Line—A big transportation company of New York that has been studying the park resorts of New England has made overtures to the officials of Riverside park, Springfield, Mass., for permission to run a bus line from Springfield to the park next season. The transportation company promises a 20-minute run with five big machines, the route to follow the river road in Agawam. The street cars are so crowded now that it is impossible often to get seats or even standing room on the electric cars.

Automobile Incorporations

AUTOMOBILES AND PARTS

Akron, O.—Ideal Commercial Car Company; capital, $200,000; to manufacture motor cars, engines trucks, etc. Incorporators: H. C. Gates, A. Tschantz, A. J. Dettoff, M. Stump, E. E. Quirk.

Boston, Mass.—Republican Motor Company of Massachusetts; capital, $1,000; to manufacture automobiles. Incorporators: Norman J. MacGaffin, E. M. Churchill.

Boston, Mass.—Motor Monitor Company; capital, $20,000; to manufacture engines. Incorporators: Howard P. Soule, Gardner W. Chase, Richard S. True, Jr.

Columbus, Ind.—Columbus Automobile Parts Company; capital, $45,000; to manufacture motor parts. Incorporators: F. H. Penfield, Fletcher Goodwell, Benjamin S. Dean, J. J. Handley.

Hamilton, O.—Ideal Steel Wheel Company; capital, $500,000; to manufacture and deal in spring wheels for automobiles. Incorporators: J. E. Strietelmeier, A. F. Parker, D. E. Kiegan, Walter C. Taylor, James B. O'Donnell.

Indianapolis, Ind.—Hydraulic Transmission Company; capital, $200,000; to manufacture a hydraulic clutch for automobiles. Incorporators: W. K. Millholland, Paul Millholland, Ernest Millholland.

Louisville, Ky.—Edwards Motor Car Company; capital, $750,000; to manufacture motor trucks.

Louisville, Ky.—Commercial Automobile Company; capital, $1,500. Incorporators: J. N. Gibbons, W. B. Williams, E. N. Williams.

Madison, Wis.—Power-Stevens Fan Devices Company; capital, $150,000; to manufacture fans for cooling motors, and for vacuum cleaners, ventilating devices. Incorporators: Joseph C. Schubert, J. J. Power, John E. McWilliams, Leroy W. Stevens.

Middletown, N. Y.—Industrial Motor Car Company; capital, $350,000; to manufacture motor vehicles. Incorporators: William Courtland, Cuthbert Jewell, M. Crawford.

New York City.—Hurlburt Motor Truck Company; capital, $150,000. Incorporators: Joseph P. Carroll, William B. Carswell, F. D. Peale.

New York City—New York Electric Vehicle Association, Inc.; capital, $50,000; motor vehicle business, especially electrics. Incorporators: George Tiernan, Frank H. Parcells, Robert G. Reblefsen.

Richmond Hill, N. Y.—Dillman-Helin Motor Company; capital, $20,000 to manufacture motors, etc. Incorporators: William C. Dillman, Richard Dillman, Fero Helin.

South Bend, Ind.—South Bend Automobile Body Company; capital, $20,000; to manufacture automobile bodies. Incorporators: S. W. Nicholson, J. C. Paxson, V. E. Paxson.

Thomasville, Ga.—Logan Automobile Exchange; capital, $15,000. Incorporators: W. A. Logan, E. E. Mack, Roscoe Luke.

Toronto, Ont.—Central Garage & Supply Company, Ltd.; capital, $150,000; to manufacture automobiles, engines, etc. Incorporators: Robert B. Haley, Ernest S. Benyon, Roydon J. Haley.

Worcester, Mass.—Morgan Truck Company; capital, $300,000. Incorporators: Charles B. Foster, Evan F. Jones, C. H. Derby, J. R. George, John E. Bradley, C. B. Foster, L. P. Clark.

GARAGES AND ACCESSORIES

Akron, O.—Dutch Rubber Company; capital, $1,250,000; to manufacture rubber articles and automobile tires. Incorporators: E. L. Schnee, C. R. Grant, I. A. Grant, F. E. Sherman.

Akron, O.—Marathon Tire & Rubber Company; capital, $10,000; to deal in automobile tires and other rubber goods. Incorporators: Ellis R. Diehm, C. C. Owens, Sterling Newell, Donald McBride, H. J. Crawford.

Akron, O.—Mutual Oil & Supply Company; capital, $10,000; to handle Cleveland Automobile Oils, etc. Incorporator: M. L. Stuer.

Belair, Md.—Harford Garage; capital, $3,000. Incorporators: Joseph S. Archer, Richard Dallam, Philip H. Close.

Boston, Mass.—Cambridge Station Garage; capital, $6,000. Incorporators: John J. Guiney, Frank W. Roberts, David J. Murphy.

Brooklyn, N. Y.—Revilo Automobile Company; capital, $5,000. Incorporators: Philip Roth, Donato Cella, Frank Dunn.

New Schacht Truck—The Schacht Motor Car Company, Cincinnati, O., will soon put on the market a new 1-ton worm drive truck equipped with pneumatic tires.

Fitch Garford Manager.—Herbert G. Fitch, of the Willys-Overland Company, Toledo, O., has been made general manager of the Garford branch of the company.

To Handle Marvel—Frank P. McLellan has been appointed Indiana representative for the Marvel Carburetor Company, which is moving from Indianapolis, Ind., to Flint, Mich.

Electric Ambulance for Dumb Animals—The Pennsylvania Society for the Prevention of Cruelty to Animals has installed an electrically driven horse ambulance to minister to the wants of abused and suffering dumb animals.

Marvel Moves to Flint—Arrangements are being completed to move the plant of the Marvel Carburetor Company from Indianapolis, Ind., to Flint, Mich. The stock has been sold to a number of automobile manufacturers by the local stockholders.

Hamilton Is Manager—Roberts & Sherburne, who have taken on the American for Boston, Mass., have placed G. W. Hamilton in charge as manager of the agency. George Brown, who went to Boston from the American factory at Indianapolis, is manager of the service department.

Automobile Incorporations

BUFFALO, N. Y.—William Guillott Manufacturing Company, Buffalo; capital, $10,000; to manufacture stamped metal goods for the automobile trade. Incorporators: William Guillott, A. S. Guillott, Edward W. Reynolds.

BUFFALO, N. Y.—Studebaker Sales Company; capital, $25,000; to engage in selling automobiles. Incorporators: Arthur Haile, Bradley H. Phillips, E. C. Schlenker.

CLEVELAND, O.—South End Garage Company; capital, $5,000; to operate a garage and general repair shop. Incorporators: A. Haskin, H. Lewis Mock, H. Sadugar, J. E. McNemar, J. Goldstein.

COLUMBUS, O.—Southern Taxicab Company; capital, $10,000; to conduct a taxicab service. Incorporators: James J. Keating, James A. Allen, Thomas Decker, Jack Williams, A. P. Carmichael.

COLUMBUS, O.—Pomeroy Automobile and Garage Company; capital, $25,000. Incorporator: A. R. Clifton.

COLUMBUS, O.—Engle & Vincent Automobile Company; capital, $15,000; to deal in automobiles and accessories. Incorporators: Charles H. Engle, G. A. Marquardt, Frank L. Vincent, Charles W. Engle, John K. Henry.

DAVENPORT, IA.—Meinert & Rogers; to conduct a taxicab and automobile repair business. Incorporators: E. C. Meinert, W. E. Rogers.

DETROIT, MICH.—Michigan Motor Specialties Company; capital, $75,000; to manufacture automobile accessories and electrical specialties. Incorporators: N. M. Beck, C. W. Beck, Charles Wright, Jr.

GENEVA, N. Y.—D. M. Dorman Company; capital, $10,000; to engage in automobile business. Incorporators: D. M. Dorman, Charles C. Runyan, Louis J. Licht.

JACKSONVILLE, FLA.—Miller Automobile Company; capital, $10,000. Incorporators: H. Clay Stanford, C. D. Hyatt, J. J. Griffin.

LEXINGTON, KY.—Commercial Automobile Company; capital, $11,500. Incorporators: J. N. Gibbons, W. R. Williams, E. N. Williams.

LOUISVILLE, KY.—Auto-Print Company; capital, $20,000. Incorporators: W. T. Givan, B. S. Wasmer, A. H. Bowman.

NASHVILLE, TENN.—Seaton Wheel Company; capital, $130,000; to manufacture automobile wheels. Incorporator: John T. Landis.

NEWARK, N. J.—Sullivan Automobile Company; capital, $25,000. Incorporators: Jas. Sullivan, Chas. Bagole, William N. Franzel.

NEW CASTLE, PA.—Lawrence Automobile Company; capital, $40,000. Incorporators: L. C. John, George Greer, Roy Jamison.

NEW YORK CITY.—Rubberine Tire Filling and Sales Company; capital, $500,000; to manufacture rubber and substitutes for rubber. Incorporators: James D. Bridges, J. Curtis Clarke, George H. Davis.

NEW YORK CITY—Cukor Safety Crank Company; capital, $40,000. Incorporators: Bela Cukor, Isadore Eustaedter, Hyman J. Rosenbaum.

NEW YORK CITY—McGraw Tire & Rubber Company; capital, $100,000; to manufacture automobile tires and rubber goods. Incorporator: Raymond Collins.

NEW YORK CITY—Tredvent Tire Company; capital, $100,000; to manufacture automobile tires, etc. Incorporators: Nathan A. Sterling, David A. Sterling, Samuel Bing, Morris Rachmil, Louis Cantor.

NEW YORK CITY—Pioneer Motor Car Company; capital, $10,000. Incorporators: Henry J. Richardson, Northrop R. Holmes, George N. Nay.

NEW YORK CITY—Blitzen Company; capital, $1,000; to deal in automobile specialties. Incorporators: William C. Decker, James B. Mackie, Fred B. Scofield.

OCONTO FALLS, WIS.—Munsert-Carlson Automobile Company; capital, $5,000; to conduct a garage and deal in motor cars. Incorporators: W. J. Minsert, C. W. Carlson.

OTTAWA, CAN.—Hull & Ottawa Garage Company; capital, $40,000.

SHERBROOKE, CAN.—Canada Lifting Jack Company; capital, $20,000; to manufacture automobile jacks.

ST. LOUIS MO.—Swap-Benyon Automobile Repair Company; capital, $2,100. Incorporators: T. W. Swap, Charles A. Madill, Albert Banyon.

TOLEDO, O.—Heavy Tonnage Transportation Company; capital, $150,000; rapid transit of merchandise in motor trucks. Incorporators: Wm. J. Seitz, E. A. Mallory, Jacob Brecheisen, Clarence B. Hadden.

C. Y. Knight and Paul Daimler examining an American car

Cincinnati May Not Have Show—Cincinnati may have no automobile show next year. The Dealers' Association, which annually promotes these exhibitions, is not in favor of holding any more. They say that it practically puts business at a standstill for months, prospective buyers standing them off until the show.

Warren with Abbott—Joseph D. Warren, formerly with the Metzger Motor Car Company, has become New England manager of the Abbott Detroit, and he is negotiating now with some Bostonians to take over the Boston agency that has been at a standstill since the death of Willard M. Jenkins a few months ago.

Many Canadian Cars Exported—During the year ending April 30 the New Zealand Shipping Company of Montreal, Que., shipped 1,292 Canadian made automobiles to Australia and New Zealand, while this year they expect to ship to those countries 1,800 machines, 629 having been shipped already during the present season.

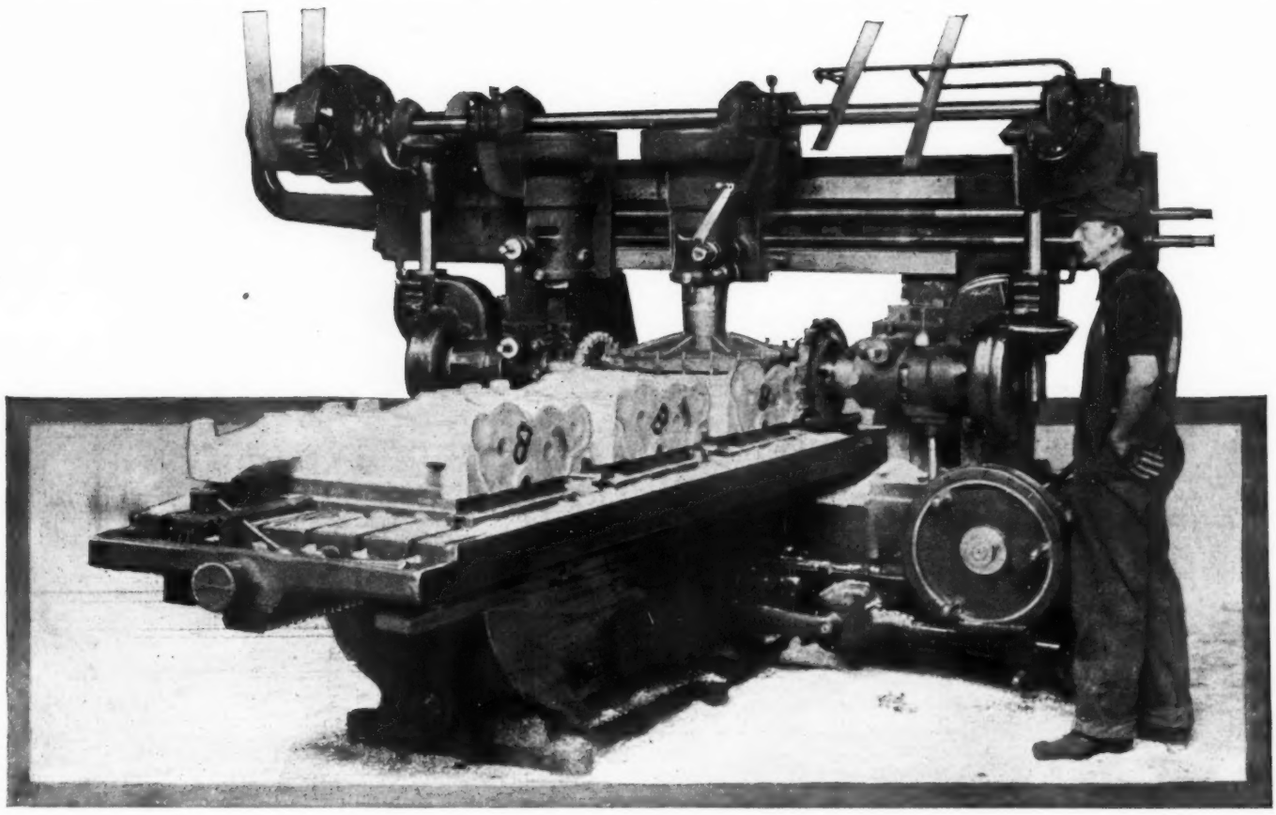
Buys Buffalo Motor Company—Charles F. Monroe has purchased the United Motor Buffalo Company from the United States Motor Company. Mr. Monroe, who was manager of the Buffalo company, will continue the distributing of the United States Motor Company products for the northern part of New York and Western Pennsylvania.

Knight and Daimler Confer—Charles Y. Knight, inventor of the sleeve valve motor, recently took an American car with his engine over to Europe, where it was inspected by Mr. Bush, chief inspector of the Daimler Company. The accompanying photograph shows Paul Daimler, head of the Mercedes factory, and Charles Y. Knight, studying and examining the construction of an American car.

Brayton Elected President—W. B. Brayton, of Cleveland, O., has been elected president of the Regal Motor Sales Company, the new Buffalo, N. Y., branch of the Regal Motor Car Company, Detroit, Mich. Mr. Brayton will act as sales manager only of the Buffalo district, while C. A. Hamilton, general manager of the new sales concern, will devote his entire time to Western New York business.

New Marmon Delivery Car—The Nordyke & Marmon Company, Indianapolis, Ind., will add a light truck to its pleasure car line. The motor will have a 4-inch stroke and there will be an automatic governor limiting the speed to 20 miles an hour. The truck will have a capacity of from 1,200 to 1,500 pounds. A distinctive feature will be the use of dual rear wheels, such as are used on the heaviest type of trucks. Pneumatic tires 32 by 4 are used on the new truck and the wheel base is 120 inches.

Factory Miscellany



Ingersoll crankcase milling machine used in the plant of the Haynes Automobile Company, Kokomo, Ind.

The above is a view of the big Ingersoll crankcase milling machine used in the manufacture of Haynes cars. The machine is in use at the Kokomo, Ind., factory of the Haynes Automobile Company, and, as may be seen from the illustration, is capable of handling three crankcases on the sliding table. There are three milling cutters in operation at the same time on three sides of the crankcase, and when this operation is complete the aluminum casting is ready to be transferred to the assembling department.

GOODRICH to Build Office—Building Inspector Goodwin, Akron, O., has approved plans prepared by the B. F. Goodrich Company for the erection of a large addition to the office building. It is the plan of the officials of the company to combine the office forces of the Goodrich and the Diamond companies, so a larger office building will be necessary. The estimated cost of the addition will be $100,000. When completed the structure will be 228 feet long and five stories high. The lower floors of the addition will be used for the general offices while the fifth floor will be reserved for the offices of the officials of the corporation. The work of construction will be started at once.

Firestone Plans Growth—Plans have been made to increase the capacity of the plant of the Firestone Tire & Rubber Company, Akron, O., at least 25 per cent. The Firestone company will also build a fireproof employment office to cost $13,000. Another large factory building is to be added to the present group.

Milwaukee County's Share—Milwaukee county, Wis., will receive the sum of $17,420.82 as returns on the payment of automobile registration fees to the state during the fiscal year of 1911-12. The registration law provides that after the secretary of state pays the expenses of administration of the registration division the remainder shall be distributed pro rata among the counties. The counties must use the returns for good roads purposes.

Toronto Plant Progressing—The plant of the Toronto Rubber Company, Toronto, O., will be completed about September 15, when it will be placed in operation. All of the repair work and improvements on the plant, which was formerly occupied by the American China Company, will be completed by that time and the machinery installed. It is the intention to employ about seventy-five men at the start. The company will manufacture all kinds of rubber articles, including automobile tires and other accessories.

To Make Hydraulic Clutch—An automobile clutch operated on the hydraulic principle will be manufactured by the Hydraulic Transmission Company, which has been organized in Indianapolis, Ind., by W. K. Millholland, Paul Millholland and Ernest Millholland, who conduct the W. K. Millholland Machine Company. The Millholland company is a contractor and manufacturer of automobile parts and will be closely allied with the new concern, which is incorporated with an authorized capitalization of $200,000.

Perfex Company Enlarges Plant—J. R. Fouch, vice-president of the Perfex Company, Los Angeles, manufacturers of the Perfex car, makes announcement that the Los Angeles plant will be greatly enlarged.

Milwaukee Rubber Company Moves—The Milwaukee Rubber Works, Milwaukee, Wis., has taken large quarters at 1928-1930 Vliet street. The company manufactures inner-liners and other tire and rubber specialties.

New Body Factory—The R. J. Irvin Manufacturing Company, Indianapolis, Ind., which makes automobile bodies and tops, has awarded the contract for the erection of a two-story factory building in Indianapolis which will cost about $50,000.

Cutting's Four-story Addition—Clark-Carter Automobile Company, Jackson, Mich., manufacturer of Cutting motor cars, has nearly completed its large and extensive four-story addition to the present plant. The company expects to occupy it by August 15.

Chevrolet Buys Plant—The Chevrolet Motor Company has purchased the plant of the Imperial Wheel Works, Flint, Mich., and will open it about September 1. The Chevrolet company is one of the organizations owned by the Republic Motor Company recently capitalized in Delaware for $65,000,000.

Top Company Moves—The Iroquois Auto Top Company, Utica, N. Y., has removed its factory from the Whiffen Block to the Cox Building. The firm has received large contracts from automobile plants in Detroit and other Western cities and increasing business necessitated the removal to larger quarters.

Racine Rubber to Grow—The Racine Rubber Company, formerly the Kelly-Racine Rubber Company, Racine, Wis., is adding a large list of new equipment which will greatly increase its plant's capacity. The company is confining its business to the manufacture of pneumatic tires for automobiles and motorcycles and has had a most profitable year.

Imperial's Increased Facilities—The Imperial Automobile Company, Jackson, Mich., has purchased the Jackson plant of the Buick Motor Car Company. This gives the Imperial two finely equipped factories, the new plant having a capacity of 8,000 cars a year, bringing the total output of the company to over 10,000 machines a year.

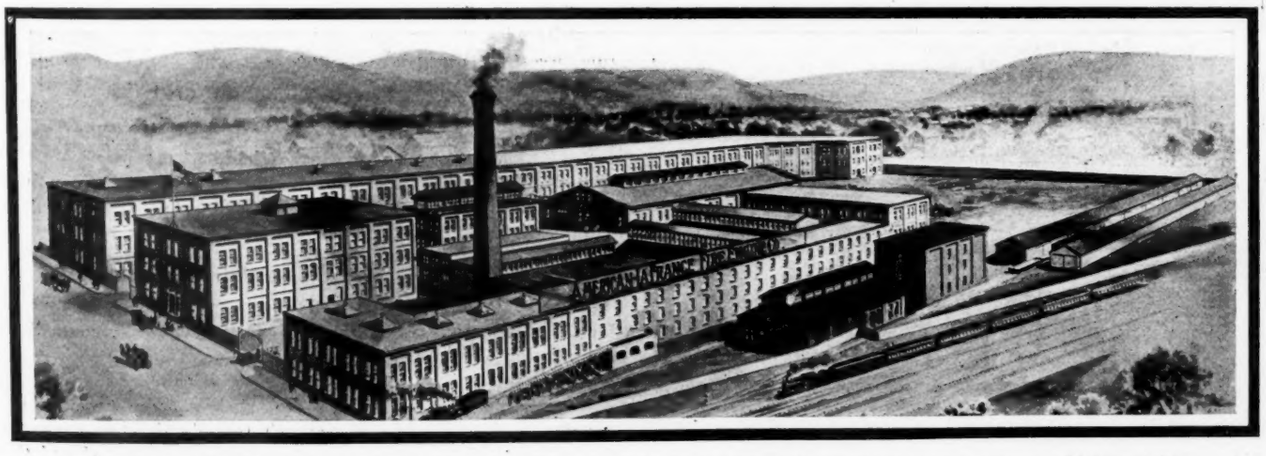
To Make Windshields Only—Manager Edward F. Adams, of the Columbus Auto Parts & Machine Company, Columbus, O., announces that in the future the concern will confine itself to the manufacture of windshields instead of covering a general line of manufacturing. Within a short time the company will put out a 1913 model windshield which will have a rain vision and a ventilator.

To Build Pleasure Cars—The Buffalo Electric Vehicle Company, the new Buffalo, N. Y., million-dollar automobile industry, has secured a lease on the building which was formerly occupied by the Denniston Company, makers of bodies for motor cars, which concern recently went into bankruptcy, and within a few days will open their pleasure car factory in that building. The branch office and showroom also will occupy this building, while the salesrooms and executive offices will be located at 200-246 West Utica street, in that city.

Bosch Magneto Not to Move—Chief Engineer Albert Klein, of the Bosch Magneto Company's plant at Springfield, Mass., has told the committee of 100 of that city that the Bosch company will not move to another location, at least for the present, but that until it is definitely settled whether or not the meat-rendering companies located near the Bosch plant, and against which many complaints have been made, are to move, the Bosch company will not make any plans to extend its factory buildings. The company is building a restaurant for its employees now and if the rendering companies were ousted it is probable that the magneto company would build additional extensions to its big manufacturing plant.

Goodyear Installs Fountains—By the installation of fifty-three fountains, through which is constantly bubbling a supply of fresh spring water, the Goodyear Tire & Rubber Company, Akron, O., has solved the problem of the summer drinking water supply for 5,000 workmen both from a sanitary standpoint and that of efficiency. A contract has been let to install a circulating system of galvanized iron piping to all parts of the factory and at convenient spots throughout the plant fountains will be located. The piping will be covered with cork to a thickness of over a half inch to insure a reasonable amount of coolness for the water, but if this is not satisfactory a refrigerator plant will be erected, through which the water will run.

New Departure Plant Busy—The New Departure Manufacturing Company, at Bristol, Conn., is working its big plant 127 hours a week in all departments and 152 hours a week in some departments with day and night shifts of skilled mechanics. This remarkable condition is assured for months to come by actual contracts for 1912 and 1913 delivery. Further increased business has been provided for by factory additions now in process of construction. These additions will give nearly 75,000 square feet of floor space, which will be available late in the fall of the present year. Three outside machine building plants and the company's own extensive manufacturing machine shop are busy on special mechanical equipment for the new buildings and is being rushed to put all departments in an efficient condition.



View of the Elmira, N. Y., factory of the American-La France Engine Company, manufacturers of heavy-duty motor trucks

Wauto Pail; Red-Head Plug; Measuring Tapes; Tri-Radiant Burner; Acorn Tire-Gauge Air Cock; Portable Grinder for Tourists' Tools; Spark-Plug Testing Device; Alcohol Headlight; Blowout Patch

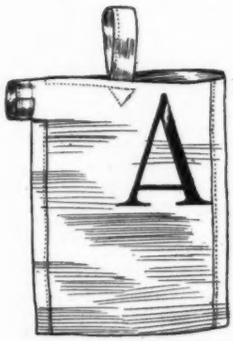


Fig. 1—Wauto pail

AMONG the latest additions to the accessory market is the Wauto tourists' pail, manufactured by the Wauto Pail Company, Broadway and Columbus Circle, New York City. The pail, Fig. 1, is made of a heavy sort of canvas sewed with a double seam all around, and no hinges, pins or rivets are used in the making of the pail. The pail is very light and may be carried flat in any suitable compartment of the tonneau, making it very suitable for camping and similar uses.

Red-Head Platinum Point Plug

Emil Grossman Company, 250 West Fifty-fourth street, New York City, announces a new spark-plug design, which is especially constructed for use with high-tension ignition systems. The plug, Fig. 2, is very similar in shape to other Red Heads, but differs from them in three principal points: The positive electrode is coated with a platinum cap 1-32-inch thick and as deep, which covers the sparking point proper and insures it against fusing even under the heat of a very strong spark; a terminal cap of special form, Fig. 3, is used, which is equally adapted for the use of ring, slip or snap cable connections; the shell is heavily nickel-coated and highly finished, mainly to give the plug a different appearance from other designs made by the same company. A further innovation is the box in which the plug is furnished; this is shaped as a torpedo, and in its base carries a wooden block threaded to fit the plug shell and hold it securely in place before it is taken out for use.

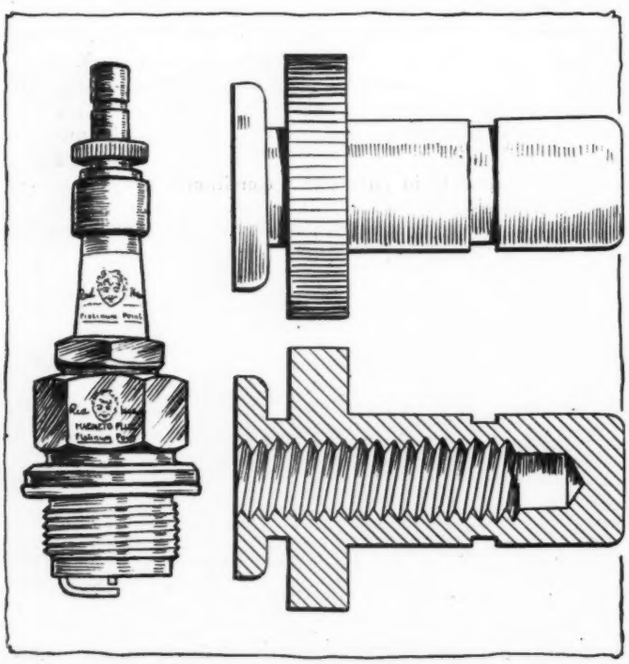


Fig. 2—New design of Red-Head spark-plug. Fig. 3—Enlarged view of Red-Head special terminal cap

Tri-Radiant Acetylene Burner

In order to utilize the whole surface of a headlight reflector, the Lenhart Burner Manufacturing Company, 246 North Delaware avenue, Philadelphia, Pa., has designed a triple acetylene burner, the Tri-Radiant, which provides three individual flames, all of which are spaced the same distance from the reflector. The acetylene enters the burner, Fig. 4, through the bottom of the bored stem and at the point where the burner branches out to the two sides a valve is provided to open or shut off the flow of gas to each of the side burners. This feature permits of regulating the amount of acetylene used according to the operating conditions.

Luther Portable Tool Grinder

Tourists desiring to carry a small and handy tool grinder with them while traveling will find the Luther device, Fig 5, an instrument well adapted to their needs. This tool is operated by hand, using a long crank which is geared to the grinding wheel at a ratio of 1 to 20. The wheel is of Dimo-Grit, a very hard material, and is hollowed out to accommodate four pinions which bring about the gear reduction specified above. The wheel has a diameter of 5 1-2 inches and, with all the other parts of the apparatus, may be packed in a box 5 3-4 inches square. The tool rest and clamp which are furnished with the grinder permit of attaching it to the car quickly and in any suitable position.

Novel Steel Measuring Tapes

A complete line of measuring tapes is manufactured by the Lufkin Rule Company, Saginaw, Mich. Some of these devices use linen tapes, others steel, and the housings in which they are inclosed are either of leather or brass. In Fig. 6, a type specially adapted to engineer's uses is shown. The steel tape of this design is 1-4-inch wide and is wound around a spool by means of a folding, winding handle attached to the spool on the front of the casing. The latter is made of brass and nicely finished with nickel plating. The outside of the tape passes through the eye of a steel frame to which a handle is attached, but this frame is detachable. The tape is marked in tenths of an inch on one side and in twelfths on the other and is supplied in lengths of from 33 to 300 feet.

Acorn Tire-Gauge Air Cock

Stevens & Company, 375 Broadway, New York, manufacture the Acorn air cock, Fig. 7, which is used while controlling the inflation of a tire with a Stevens gauge. The air cock is attached to the end of the hose through which the compressed air is led into the tire. The top of the cock is screw-threaded internally to fit any external 1-8-inch thread; the tire gauge is threaded into this passage and when the cock is opened and the air passes through it, it also presses on the gauge and there indi-

cates the degree of inflation. When the desired pressure has been reached, the cock is shut off and removed. If no gauge is used in the inflation work, the thread may be closed by a standard 1-8-inch plug.

Hardy Plug Testing Device

Spark-plugs which miss fire may be easily located by the R. E. Hardy Spark Plug Company's tester, Fig 8, made at Austin avenue and May street, Chicago, Ill. It consists of two contact pieces which are separated by a small spark-gap and to which is fitted an insulator handle. In testing the plug which is suspected as misfiring, one of the contacts is placed against the binding post and the other against the plug shell, and in case there is no spark between the two electrodes, a spark will jump the inclosed gap of the tester. The use of this device is very comfortable, as the spark-plugs need not be disturbed in any way while being tested.

Butylite Alcohol Headlight

An entirely new line of automobile headlights has been evolved by the Butylite Automobile Headlights Company, New York City, which use alcohol as a fuel and therefore does away with electric or acetylene generator, tanks or other means of carrying or producing a light-generating medium. The fuel is carried in a small vessel under the lamp and is forced to the burner by the pressure of air which has been pumped into the container by a small hand pump. One filling of the vessel is sufficient to keep the lamp burning for 20 hours, the alcohol being vaporized and burned in a small, thick Welsbach mantle which is claimed by the maker to be shock proof.

Essex Rubber Blowout Patch

The Westchester Appliance Company, 8 West Sixty-second street, New York City, distributes the Essex rubber blowout patch. This patch is made of seven plies of sea island cotton, frictioned together with a fine grade of rubber. It goes between inner tube and casing, and is so shaped that it may be folded around the bead of the casing. The patch is made in five sizes for application to 3, 3 1-2, 4, 4 1-2 and 5-inch tires.

Accelerator for Ford Cars

Owners of Ford model T cars will be interested in a simple outfit made by the Lincoln Machine Shops, Lincoln, Ill., which provides an accelerator pedal for this type of automobile. This equipment comprises a triangular plate to the end of which a bell crank lever is attached, a small connection from the bell-crank lever to the hand throttle rod, a cable connection from the lever to an accelerator pedal on the footboard and a spring which returns the bell-crank lever to the closed-throttle position. The triangular plate is attached by bolting under the two-cylinder head bolts of the last two cylinders, and the connection between bell-crank and throttle rod is so made that when the bell-crank lever is turned, as the operator depresses the accelerator pedal on the floorboard, the throttle rod is twisted and the carbureter throttle opened.

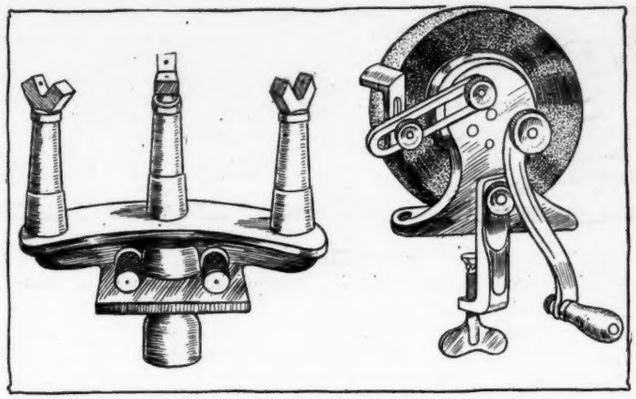


Fig. 4—Tri-Radiant acetylene burner. Fig. 5—Dimo-Grit tool grinder for touring use

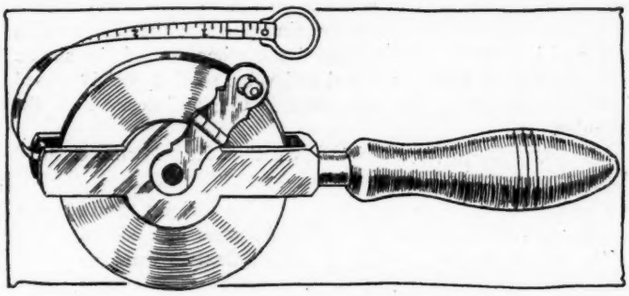


Fig. 6—Lufkin Steel measuring tape for engineers' use

Stellite Composition Metal

Elwood Haynes, the original designer of the Haynes car, 305 N. Washington street, Kokomo, Ind., has succeeded in compounding a new metal which is of extraordinary hardness and thereby fit to take the place of steel, while it is not subject to rust, being oxidized only at red heat and then but slightly. The material stands between steel and silver in whiteness and brilliancy. Its elastic limit is 85,000 pounds and its tensile strength 110,000 pounds. The co-efficient of expansion is almost as low as glass, and the metal is chemically inert, being attacked only to a slight degree by dilute muriatic or sulphuric acid, but not by sublimate, alkali solutions, etc. As the metal is an alloy, its elements may be mixed in various quantities, and the range of hardness obtainable in this way is between high carbon steel and rock crystal.

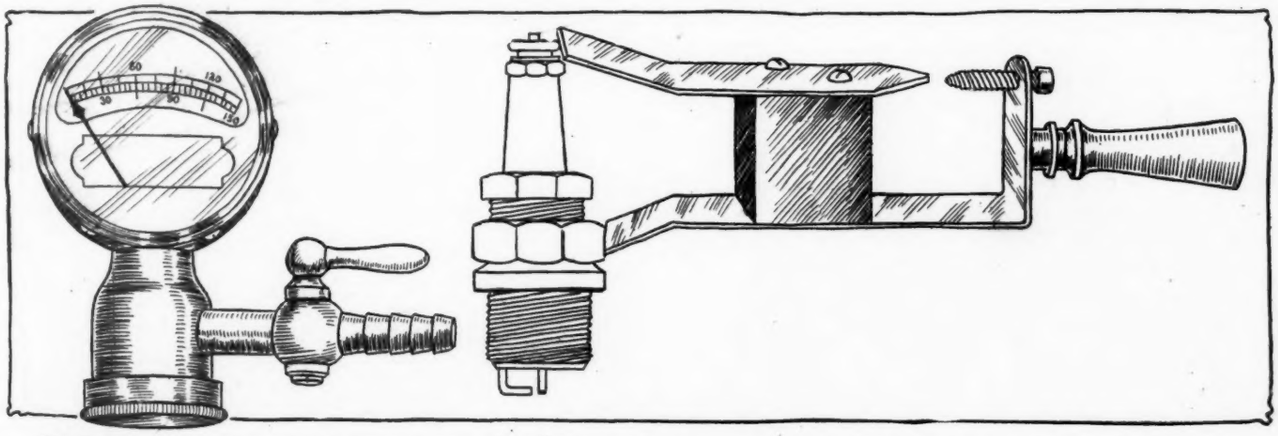


Fig. 7—Acorn air cock used while controlling inflation of tire with Stevens gauge. Fig. 8—Hardy device for testing spark-plugs

Patents Gone to Issue

INTERNAL-Combustion Motor—In which the feeding of fuel from a reservoir is accomplished through a cam-operated valve.

The patent relates to an engine construction, Fig. 3, consisting of a working cylinder, frame and crankshaft C, which latter drives a camshaft C1 by means of gearing. The fuel used by the engine is fed from a receptacle F through a passageway M, and its flow is controlled by a valve V. The latter is carried by a rod R which, at its lower end, carries a cam follower. A cylindrical sleeve S is in position on the camshaft and rotates therewith, and there is a cam tapering down to the sleeve and a cam which extends a little beyond the other end of the sleeve. These two cams actuate the rod and valve so that fuel is passed intermittently from the receptacle F to the interior of the cylinder.

No. 1,034,732—to James H. Pierce, Bay City, Mich. Granted August 6, 1912; filed September 18, 1911.

Flexible Shaft Connection—In which driving and driven member are connected, at a varying distance, by a sleeve.

The subject-matter of this patent, a flexible connection for shafts, as shown in Fig. 1. The device consists of a sleeve with an opening which is non-circular in transverse section and into which a driving and a driven member project. Each of these two members fits the sleeve closely at all points of the engaging surfaces, and sections are so formed in the sleeve as to permit relative tipping movement of some parts. The sleeve is pivoted at one to a lateral extension of a rotating shaft.

No. 1,034,453—to Lindley D. Hubbell, Hartford, Conn. Granted August 6, 1912; filed July 24, 1906.

Vehicle Cushioning Device—Comprising two hollow sections which are in telescoping, airtight engagement.

This patent describes a construction, Fig. 4, which consists of two relatively movable sections, an upper one V and a lower one L. The upper section is so shaped as to form a longitudinally extending chamber between its portion O and I. This chamber is adapted to receive the lower section L, but is wider than the thickness of that section, so that a certain lateral play is insured between V and L. The inner portion I of the section V is considerably longer than O, and its outside is shaped with two annular grooves, one above and one below the level of the lower edge of O. Likewise, O has an annular groove on its inside and near its edge, and packing rings R in these three grooves provide an airtight engagement of the sections V and L.

No. 1,035,022—to Laurence L. Leasure, Winfield, Kan. Granted August 6, 1912; filed September 13, 1911.

Internal-Combustion Motor Valve—Being a gear designed to actuate the inlet and exhaust valves of a cylinder.

The motor valve design here described is shown in Fig. 2. It consists of a cage which has an outer wall O provided with ports, an inner cylinder wall W and a hollow guide structure S supporting a valve stem S1, the end of which carries a valve V1. Within the inner cage wall a sleeve valve V is mounted. This is formed with a flange F capable of seating simultaneously upon the ends of the walls O and W. In the hollow valve guide a coiled spring controls the normal position of the stem S1 and the valve V1, and another spring is coiled around the guide structure serving the same purpose in the case of valve V. Bar connections to the camshaft of the engine are so constructed that, upon moving a bar in one direction, one valve is operated, while moving it in the other direction the other valve is moved.

No. 1,034,708—to William Henry, Philadelphia, Pa. Granted August 6, 1912; filed September 18, 1907.

Transmission Gearing for Automobiles—Comprising two rotors, the engagement of which is controlled by a movable transmission shaft.

This patent relates to a transmission comprising a transmission shaft of such length and texture as to permit of slight flexure and so supported as not to interfere with the flexure of the shaft. A friction rotor is carried by this shaft, bearing normally against a driving rotor. Means are provided to spring the transmission shaft so that the driving and driven rotors are separated.

No. 1,032,350—to Gustave Dumont, Neuilly-sur-Seine, France. Granted July 9, 1912; filed February 15, 1909.

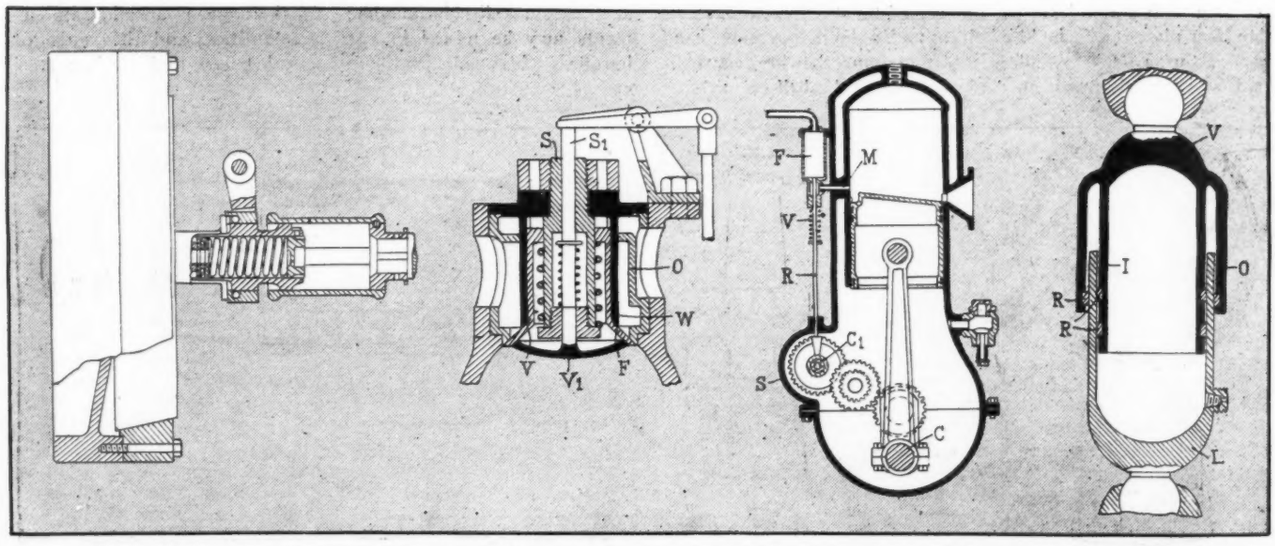


Fig. 1—Hubbell flexible connection. Fig. 2—Henry valve. Fig. 3—Pierce motor. Fig. 4—Leasure cushioning device.